THE FLORA OF CAPE JOURIMAIN NATIONAL WILDLIFE AREA, NEW BRUNSWICK

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TECHNICAL REPORT SERIES No. 129
Atlantic Region 1991
Canadian Wildlife Service

Environment Canada
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CANADIAN WILDLIFE SERVICE

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The Flora of Cape Jourimain National Wildlife Area, New Brunswick

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This publication may be cited as:

Harries, H., MacKinnon, C.M., and C. Ellingwood. 1991. The Flora of Cape Jourimain National Wildlife Area, New Brunswick. Technical Report Series No. 129. Canadian Wildlife Service, Atlantic Region.

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Issued under the authority of the
Minister of Environment
Canadian Wildlife Service

Ministry of Supply and Services Canada 1991
Catalogue No. CW 69-5/129E
ISBN 0-662-18751-2
ISSN 0831-6481

Copies may be obtained from:

Canadian Wildlife Service
Atlantic Region Headquarters
P.O. Box 1590
Sackville, N.B. E0A 3C0

ABSTRACT

The flora of Cape Jourimain National Wildlife Area (CJNWA) has been studied by various individuals, over the past 20 years. In 1988 and 1989, an intensive survey and collecting program was conducted within the CJNWA and adjacent areas. A total of 321 species, varieties, and named hybrids were recorded. Based on the local occurrence, in relation to their regional or national distribution pattern, 45 of these taxa (14% of total) were classified as rare. For each of these rare species, detailed information on distribution and habitat within the NWA was obtained, and related to the overall distribution in the Maritime Provinces and in eastern North America. The large diversity of plants and high number of rarities, represents an area of significant botanical interest. A discussion of the factors responsible for this concentration of rarities is presented. In lieu of the possible construction of a fixed link to P.E.I., a list of recommendations for the preservation of those key areas where the rarities occur is included.

RÉSUMÉ

Diverses personnes ont étudié la flore de la réserve nationale de la faune du Cap-Jourimain (RNFCJ) au cours des vingt dernière anneés. En 1988 et 1989, un programme intensif de recensement et de collecte a été mené dans la RNFCJ et les environs. On a recensé en tout 321 espèces, variétés et hybrides désignés. En se fondant sur leur apparition dans la région locale, par rapport à la dispersion à l'échelle régionale ou nationale, 45 de ces taxons (14% de l'ensemble) ont été classifiés comme des espèces rares. Pour chacune de ces espèces rare, on a recueilli des renseignements détaillés sur la dispersion et l'habitat au sein de la réserve nationale de la faune, en comparaison avec la dispersion globale de l'espèces dans les provinces Maritimes et dans l'est de l'Amérique du Nord. La grande diversité des plantes et la grand nombre d'espèces rares font de la région une zone revêtant un intérêt considérable sur le plan de la botanique. Ce document présente les facteurs à l'origine de la concentration dans ce secteur d'autant d'espèces rares. Voici une liste des recommandations en vue de la protection des secteurs clés où apparaissent les espèces rares dans l'éventualité de la construction d'un lien fixe avec l'Î.-P.-É.

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INTRODUCTION

Cape Jourimain National Wildlife Area (CJNWA) was established in 1979 to conserve and protect important habitat for migratory birds, specifically waterfowl and shorebirds. The National Wildlife Area (NWA) supports a high habitat diversity, thus making it especially attractive to a wide variety of wildlife.

Cape Jourimain is also an area of high geographic importance as it is the most prominent coastal headland in the Northumberland Strait. The strategic importance of the Cape Jourimain headland has also been evident to developers. As far back as 1900, the site has been identified as the most logical location to build a connection, "fixed link", between New Brunswick (NB) and Prince Edward Island (PEI). The first such link was initiated in the mid 1960's, when a road and railway bed was built from highway #16 out to Jourimain Island. This road/rail bed, known locally as the "causeway", created two large brackish ponds out of what was once intertidal saltmarsh and irrevocably changed the character of the area.

The mid-1960's attempt for a fixed link between NB and PEI was abandoned in 1966 before work on the actual over-water structure commenced. During the past five years, there has been renewed interest in building a fixed link to P.E.I. The tentative plan is to use the old road bed, built in 1966, as the new approach for the proposed bridge. If the link is built according to this plan the NWA will be bisected by a major highway along the present Department of Public Works right-of-way.

Harries conducted informal studies of Cape Jourimain flora from 1973-75. Malone (1978) conducted the first complete vegetation survey for CJNWA with supporting work by MacInnis (1979) and Barkhouse (1977). These preliminary surveys identified significant habitat types that were unique to the area. In the current management plan for the area, Barkhouse (1983) identified

the Red Oak stand on Allen Island and the Cedar swamp as warranting special status and further research.

To provide pre-disturbance base line data, recent botanical work has been conducted by Harries (1989) and P.Lane and Assoc. (1989). Continued work by the senior author, after completion of his 1989 report, lead to substantial new finds and added further to our knowledge of the history of land use and human disturbance in the NWA. The " history of land use" component of this work was presented, by H. Harries, as a paper in the Mount Allison University, Bell Lecture Series, 1990.

1. History of Human Land Use

The present features of CJNWA reflect the varied effects of a long period of land use. Historical records show the presence of an Acadian settlement within the Tormentine area by the early 1750's, and remains of old dykes enclosing the marshes along the mainland may date from this period. After expulsion of the Acadians in 1755, the area remained unpopulated until the early 1800's. By 1830, a large proportion of the salt marsh of the Wildlife Area had been diked and was being used for the production of marsh hay. Following diking, a road was built across the marsh to Trenholm and Jourimain Islands and permanent residences were established. Large portions of the islands were cleared for cultivation and cutover for timber and firewood. For a number of years, a lobster packing plant was operated on Jourimain Island.

Until about 1915, Jourimain Island was the mainland terminal for ice boats that operated between New Brunswick and Prince Edward Island, providing a vital communications link between Prince Edward Island and the mainland during the winter months when the Northumberland Strait was frozen over. A small hotel service for people using the ice boats was operated by one of the Jourimain Island residents. In 1870, a lighthouse was established on Jourimain Island. A light keeper resided on Jourimain Island until

the early 1960's when the light was automated. The light is still maintained by the Federal Department of Transport.

Between 1915 and 1920, the dikes that had protected the marshes were destroyed by a series of storms, and the sea once again began to flood the marshes. The road was also damaged and access to the islands became difficult. The New Brunswick Government bought the land and the island residents moved to the mainland between 1933 and 1940. Thereafter the islands and the marshes became agriculturally idle.

For the following 30 years there was little activity at Cape Jourimain other than waterfowl hunting, clamming and fishing along the shores. However, in the mid-1960's, the area was chosen as the approach for a proposed causeway link between New Brunswick and Prince Edward Island. By 1966, a prominent roadway and railway bed had been built across the area. Although the causeway concept was abandoned, the roadbed construction had a dramatic impact on the area. Besides effectively linking the marshes and islands to the mainland and providing easy access, the normal tidal flow into the western part of the salt marshes was blocked. Subsequently, most of this marsh area became submerged under two brackish impoundments. Human use of the area has increased significantly as a result. Waterfowl hunting pressure has increased and the area has become a favoured location for naturalists, bird watchers, botanists, photographers and beachcombers. For a time there was also some extensive pasturing of cattle by a local farmer.

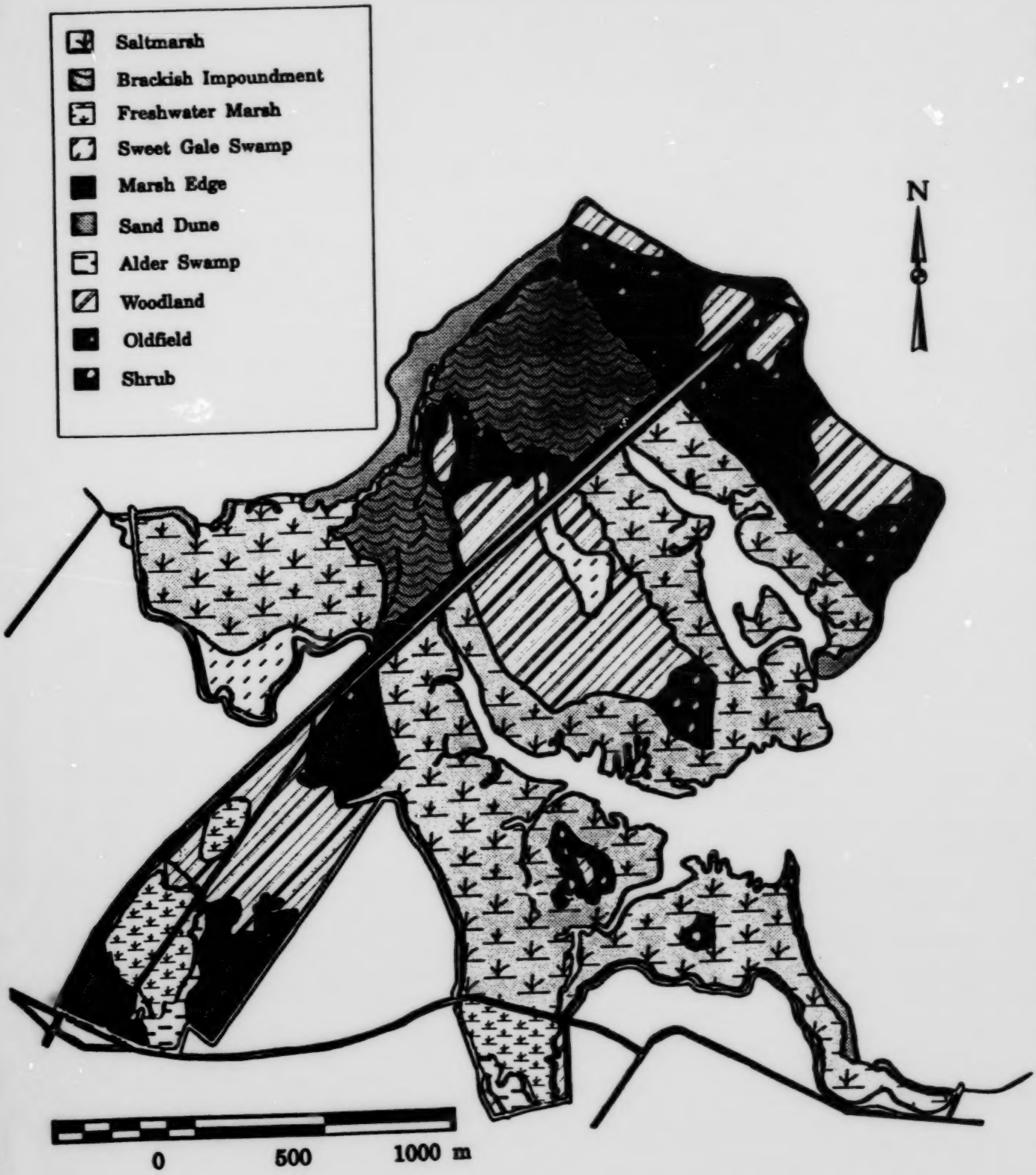


Figure 1. Location and extent of major habitats at CJNWA

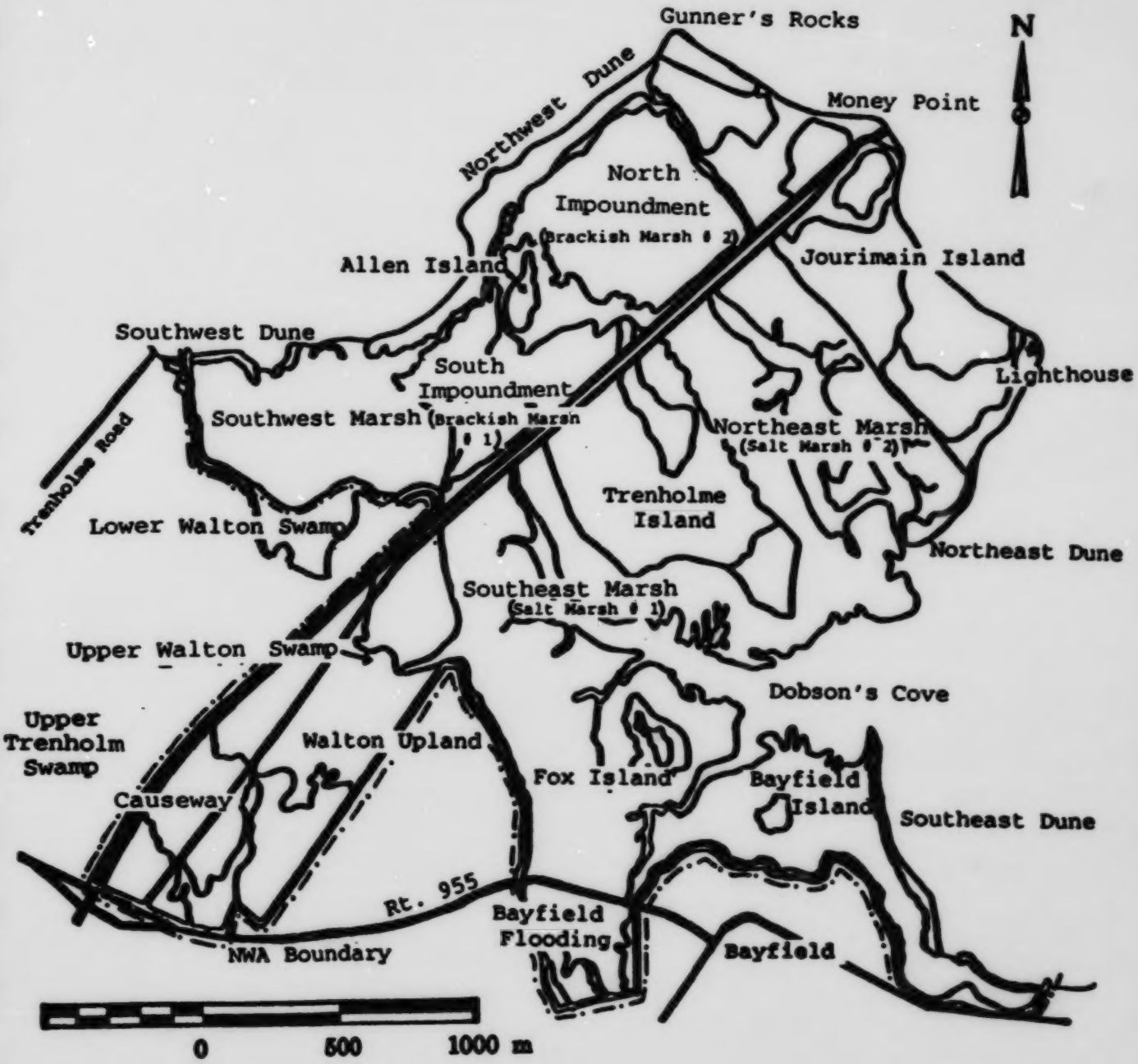
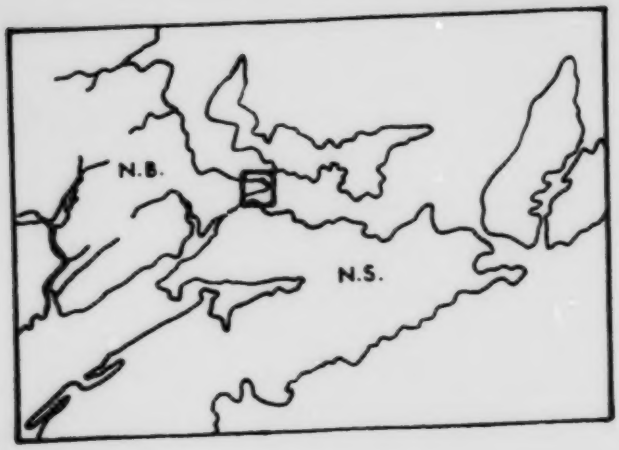


Figure 2. Location of key features of CJNWA.



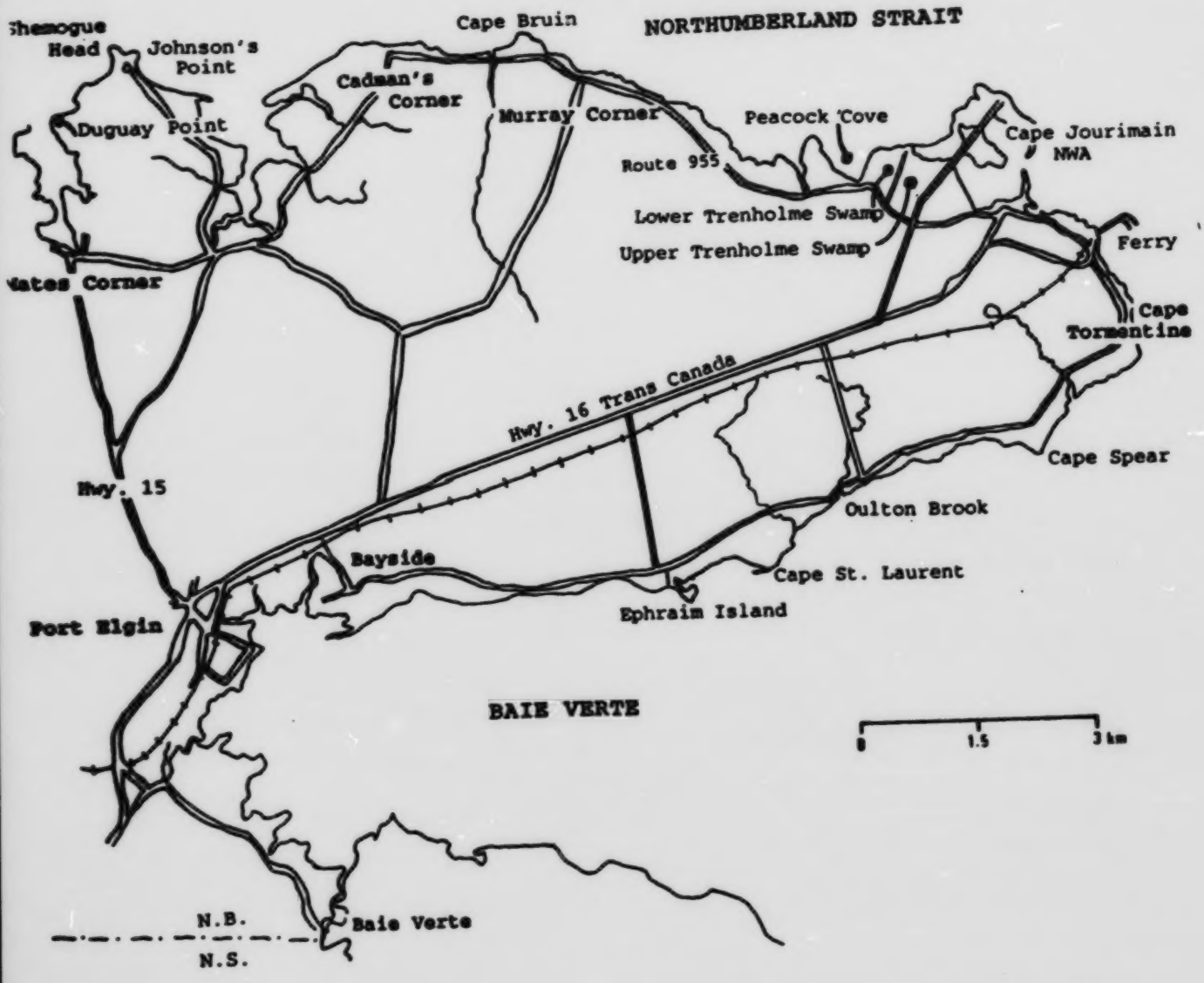


Figure 3. Location of key features on Cape Tormentine Peninsula

STUDY AREA

Cape Jourimain National Wildlife Area is located on the Northumberland Strait, near the tip of the Tormentine Peninsula, at the southeastern extremity of NB (Figure 2). The 600 ha (1500 acre) coastal wildlife area was established in 1979 following the transfer of 205 ha from the Federal Department of Public Works in 1977 and the purchase of additional properties in 1979.

The Cape Jourimain headland extends seaward 2.5 km from the main coastline and is completely included within the CJNWA. The principle landscape features of CJNWA are extensive coastal salt to brackish marshes and impoundments, barrier sand dunes, two upland islands (Trenholm and Jourimain), and a bordering block of mainland upland. The prominent roadway that crosses the area, owned by the Department of Public Works, effectively links all the components. The basic habitat types and their respective sizes are:

1.	Saltmarsh	240 ha
2.	Forest	105 ha
3.	Old field	62 ha
4.	Brackish impoundments	55 ha
5.	Tidal channel	25 ha
6.	Shrub upland	27 ha
7.	Sand dune	24 ha
8.	Freshwater marsh	18 ha
9.	Brackish edge of impoundments	18 ha
10.	Beaver pond flooding	12 ha
11.	Alder swamp	9 ha
12.	Sweet gale swamp	6 ha
13.	Cedar swamp	1 ha

Together, wetlands make up 64% (382 ha) of the NWA. A sandy beach bounds the sand dunes on the northwest side, shallow intertidal flats adjoin the northwest and southeast sides of the NWA and rocky ledges at Gunner's Point (see Figure 2), extend out

from the northern-most point.

The saltmarsh is mostly "low marsh", being flooded daily by the tides and is vegetated primarily by the cordgrass Spartina alterniflora. A narrow transitional zone with S. patens and S. pectinata occur between the main marsh bodies and the uplands.

METHODS

The flora and vegetation of CJNWA were studied informally, by the senior author, in 1973, 1974 and 1975. At this time most of the rare species in the area were discovered; Walton Swamp and the swamp forests of the mainland, however, were left unexplored.

Allen Island was again visited on Sept. 21, 1986, when Polygonum scandens was discovered and the rare Teucrium canadense was found again.

Most of the fieldwork was conducted by the senior author between August 17 and 21, 1988, and August 6 - 20, 1989, when development of the vegetation was at its seasonal peak. Additional trips were taken earlier in the growing season in 1988, 1989, and 1990. Work in 1988 was confined to the coastal flora occurring within and outside the coastal forest edge. In 1989, emphasis was on the forest flora of both uplands and swamps. A complete floristic inventory was an objective only for coastal habitats and for the remnants of relatively natural upland and swamp forests. Parts of the CJNWA which were not visited by the senior author include: Fox Island, a potentially interesting locality, which was found to be inaccessible; the wetter seaward portions of the lower saltmarsh (with Spartina alterniflora as dominant) which are difficult to access, and unlikely to contain any rarities; Bayfield Flooding, an impoundment south of Highway 955; and the beaver flooding of the mainland portion. In the last area, MacKinnon discovered the rare watershield (Brasenia schreberi) in 1989.

1. Place Names

Place names used throughout this report are as follows: The Cape Jourimain National Wildlife Area is referred to throughout as CJNWA. Some traditional place names are used as per MacInnis (1973) and Barkhouse (1983), such as Jourimain, Trenholm and Fox Islands. Other localities appear to be without traditional names. To facilitate more precise descriptions of certain habitats and regions, the following place names are used for this report. * (See Figure 2)

Northeast Marsh: Salt marsh area between Jourimain Island and Trenholm Island, opening eastward to the tides.

Southeast Marsh: Eastern part of salt marsh area between Trenholm Island and the mainland, opening eastward to the tides.

Southwest Marsh: Western part of salt marsh area between Trenholm Island and the mainland, opening westward to the tides.

North Impoundment: Former salt marsh area between Jourimain and Trenholm Island converted into a brackish impoundment by causeway construction; separated by causeway from the Northeast Marsh.

South Impoundment: The corresponding impoundment between Trenholm Island and the mainland. To the southwest bordering onto the Southwest Marsh and to the east separated by the causeway from the Southeast Marsh.

Allen Island: A small marsh island northwest of Trenholm Island. Named after the Allen family which has been associated with the Jourimain area since the early 1800's. Sometimes referred to as Oak Island.

Walton Swamps: The Walton Swamps have been named after Mr. Garth Walton, a former owner. They extend southward from the Southwest Marsh between two low ridges of upland. This swamp is now bisected by the causeway. The part northwest of the causeway and outside CJNWA is referred to as Lower Walton Swamp and the part southeast of the causeway as Upper Walton Swamp. Lower Walton Swamp has remained in a near-natural condition. Most of Upper Walton Swamp was once cleared and is now an alder swamp. Its westernmost part was left as forest and includes a small cedar swamp.

Trenholm Swamps: The Trenholm Swamps have been named after the Trenholm family, who likewise has been prominent in the Jourimain area. The swamps occupy an upland depression east-southeast of the Walton Swamps and are separated from the latter by a low ridge. The Lower Trenholm Swamp extends from the tidehead east of Peacock Cove (see Figure 3) to the Trenholm Road, outside of the CJNWA. It is a hardwood swamp which has not been cleared and contains several rare species. The Upper Trenholm Swamp extends from Trenholm Road to near Route 955. Its southeastern part is within the CJNWA. It is now almost entirely flooded and has therefore lost most of its interesting natural features due to causeway construction, and beaver activity. The remaining part, west of the causeway and outside CJNWA, is an interesting area that is a species-rich and still relatively natural and undisturbed swamp forest.

Dunes: A discontinuous barrier of beaches and dunes connects Jourimain Island to the mainland, and encloses the complex of

salt marsh, man-made impoundments, and the smaller marsh islands within. These beach and dune complexes include the Southwest Dune, Northwest Dune, Southeast Dune and Northeast Dune.

* Note: In previous CWS reports, the Northeast and Southeast Marshes are referred to as Salt Marsh #2 and #1, respectively; the North and South Impoundments are referred to as Brackish Marsh #2 and #1, respectively. The CWS designations for these four localities have been retained in the rare species Data Sheet maps.

2. Flora List (Appendix A) and Rare Plant Data Sheets (Appendix B)

The area covered in species inventory and data sheets is the CJNWA and adjacent beach, swamp, and forest areas, south to Route 955 and west to the Trenholm Road. The outside areas include Lower Walton Swamp and Upper Trenholm Swamp. Species found outside the CJNWA are prefixed by a 'o' in Appendix A. Species without this prefix have been recorded within the CJNWA.

Completeness: A complete species inventory was an objective only for plants of coastal habitats within and outside the coastal forest edge, for swamp forests, and for relict hardwood forests. Thus some common and expectable species may have remained unrecorded, for example, Ranunculus repens, Galeopsis tetrahit, and Rhinanthus crista-galli. Floristic field work did not include the beaver flooding in the mainland portion, except for a record of Brasenia schreberi, nor the Bayfield Flooding south of the highway. Therefore, a number of fresh-water wetland and aquatic plants within the CJNWA remained notably unrecorded.

Common Names: English names follow Hinds (1986), Roland and Smith (1969), and Scoggan (1978, 1979). French names follow Gillett (1978), Hinds (1986), Marie-Victorin (1964), and Scoggan (1978, 1979).

Identification: Plants were identified by H. Harries. Scientific plant names follow Scoggan (1978, 1979). An exception has been made only for Odontites; the reasons for this are explained on the Odontites data sheet (Appendix B). Some plants from difficult groups have not been identified to species. These include Puccinellia (Graminae), Polygonum sect. Avicularia (Polygonaceae), Atriplex, Chenopodium, Suaeda (Chenopodiaceae), Amelanchier, Crataegus, Rubus (Rosaceae), and Euphrasia (Scrophulariaceae). On the Data Sheets, information has been provided only in case of difficulties or literature disagreements.

Documentation: The present report is based on field records and collections by Harries, between 1986 and 1990. Specimens have been deposited in the Mount Allison University Herbarium, Sackville, N.B. Collections are identified by an eight-digit code. The first six digits indicate the year, month and day of collection; the last two indicate the running numbers for each collection day.

For the Rare Species Data Sheets, the following information is provided:

Maritime Provinces: Describes distribution based on published information, for Nova Scotia by Roland and Smith (1969), for Prince Edward Island by Erskine (1985), and for New Brunswick by Hinds (1986). References have been given for other sources. From this published information significance of a species' occurrence in the Jourimain area has been assessed through a "rarity rating". Species have been rated as follows:

* Rare. Occurrence in Jourimain area near edge of range; with only a few other records near Gulf of St. Lawrence between Miscou Island and Merigomish Island. Thirty-seven species.

** Very rare. Occurrence in Jourimain area represents a significant extension of range within the Maritime Provinces. Seven species.

*** Extremely rare. Occurrence in Jourimain area is a major addition to distribution pattern in eastern Canada. One species: Aster subulatus.

Other records from Tormentine Peninsula: Based on field records and collections by Harries between 1986 and 1990. Specimens have been deposited in the Mount Allison University Herbarium. The Tormentine Peninsula is defined as extending east of Highway 15 from Port Elgin to Mates Corner (see Figure 3).

Maritime Habitat: Descriptions of habitat in the Maritime Provinces are based on Erskine (1985), Hinds (1986), Roland and Smith (1969), and Scoggan (1978, 1979).

Eastern N.A. Range: Describes the distribution of the species near the North American east coast, according to Fernald (1950), Rousseau (1974), Scoggan (1978, 1979), and Seymour (1969). Species with a centre of latitudinal distribution south of the Maritime Provinces were classified as 'Southern', while those with a centre north as 'Northern'. Those with no classification indicate a centre of distribution within or near the Maritime Provinces. Information is also provided on the native or introduced status of species, indicating whether or not they are assumed to have been present in the Maritime Provinces prior to European contact.

Distribution Map: Shows the distribution of each species within CJNWA and adjacent areas, as recorded by Harries between 1986 and 1990. Inset maps shows the distribution within the Maritime Provinces, based on information by Erskine (1985), Hinds (1986), Roland and Smith (1969), and on unpublished records by Harries and by Fairbanks and Harries.

RESULTS AND DISCUSSION

1. Occurrence of Rare Species.

A total of 321 species, varieties, and named hybrids were recorded for CJNWA and adjacent beach, swamps and forested areas; 261 within CJNWA and an additional 60 taxa in adjacent areas. With inclusion of difficult groups, a survey of freshwater and aquatic habitats, and more thorough investigation of oldfield areas, the total is likely to be above 300. Of the 321 taxa, 45 (14% of total) were classified as rare. Of these, 4 species are introduced, 2 are possibly introduced, and 39 are native. 36 of these rare taxa occur within the CJNWA; in addition several of the rare species of Lower Walton Swamp may extend marginally into CJNWA. Four of the rare species are listed among the Rare Vascular Plants of N.B. (Hinds, 1983): Aster subulatus, Euphorbia polygonifolia, Polygonum arifolium, and Polygonum ramosissimum. Another rare species, Juncus greenei, reported by Hinds (l.c.) for Cape Jourimain was not observed in the present survey.

The relatively large number of rarities in the Cape Jourimain area can be related to the following features: (1) high summer temperatures and relatively late fall, (2) a variety of beach and salt marsh habitats, with the diversity of the latter increased by anthropogenic disturbances, and (3) exceptional diversity of natural coastal forest edge vegetation patterns.

(1) Of the 39 native rare species, 22 (61%) were classified as "Southern" and 3 (8%), as "Northern". The southern rarities were found in a large diversity of habitats, including beach, salt marsh, fen, coastal forest edge, upland hardwood forest, and swamp hardwood forest. The pronounced southerly character of the Jourimain flora is probably due to the relatively warm, sunny, and fog-free summer and fall weather of this area, which is related to the very high summer water temperatures of the surrounding marine

areas. A contributory factor for the latter are the asymmetrical tides of the Northumberland Strait, allowing for daytime warming of exposed intertidal flats. The southern plant taxa can be assumed to have been more widely distributed during the Climatic Optimum (5,500 to 3,000 B.C.). Their present local and disjunct occurrences may thus be interpreted as relicts of formerly more continuous ranges. Additional rare southern species are found elsewhere in the Tormentine Peninsula, including Distichlis spicata (Harries, unpublished), and Symplocarpus foetidus (Hinds, 1986).

(2) The Jourimain area includes a naturally developed pattern of beach and salt marsh habitats. Human influences have increased complexity, as through causeway construction and through continued disturbance by vehicular traffic. With regard to different habitats, rarities are distributed as follows:

(2a) Habitats of the outer coast. This includes the upper beach with wrack deposition zone, foredune, sand flats resulting from breaching of foredune, and eroding seaward bluff of dune. These habitats are affected by intermittent salt-water flooding and mechanical disturbance, especially during winter storms. Soils are nutrient-rich due to deposition and (or) erosion. Rare plants in these habitats are Euphorbia polygonifolia, found on a bare sand flat behind a foredune, Salsola kali on upper beach and eroding seaward bluff of dune, Atriplex laciniata on upper beach, and Xanthium strumarium in zone of more heavy wrack deposition. All four species are annuals, and the occurrence of isolated plants in any locality may therefore be temporary and fortuitous. The habitat of these species is natural, widespread, and unlikely to be endangered by any future human activities.

(2b) Salt marsh habitats. Most of low marsh area is typically composed of a very monotonous and species-poor Spartina

alterniflora community. There is greater floristic diversity at higher levels with less influence of tidal flooding. The only rarity recorded which appears to be native to the salt marsh areas at Cape Jourimain, is Scirpus americanus which is confined to the Southwest Marsh.

(2c) Disturbed Brackish habitats. The causeway, constructed in 1965/66, partly blocked tidal access and stabilized the water surface at a high level for part of the salt marsh area converting it into two shallow brackish impoundments fringed by non-tidal brackish marsh. The two impoundments, continue to be influenced intermittently by salt water incursions across the Southwest Marsh. By 1982 the two impoundments and the marsh along their edge had become extremely eutrophic, especially the North Impoundment which is further removed from connection with the sea. These habitats and their vegetation may still be undergoing successional change after impounding in 1965/66 and cessation of extensive cattle grazing about the periphery, around 1980.

Four rare species occur extensively or mainly in brackish marsh vegetation surrounding the North Impoundment. These include three native species; Aster subulatus var. obtusifolius, which is locally frequent and even dominant, Polygonum ramosissimum, and the relatively rare Rumex maritimus var. fueginus, together with the introduced Vicia tetrasperma. All four taxa are annuals and tend to occur in areas of recently dead or decadent perennial, rhizomatous, salt marsh graminoids, including Scirpus maritimus, Spartina alterniflora, S. patens, and Festuca rubra.

Three rare introduced annual species are found exclusively in vehicle tracks in areas of moist and slightly brackish soil; Veronica peregrina was found only on the causeway, Odontites serotina also on Jourimain Island, both in exposed, salt-spray-influenced areas. Centaurium pulchellum occurs in both of these

habitats and in low, disturbed vegetation of vehicle tracks through disturbed brackish marsh near the North Impoundment. Another rare species of disturbed brackish marsh is a perennial, the sedge Carex mackenziei. It occurs in low wet spots within the Southwest Marsh. It was found in the same locality in 1973 and 1988 and may have been present here already prior to impounding.

(2d) Habitats of slightly brackish marsh areas landward of the salt marsh. Dominant plants are tall spreading perennials, including Phragmites australis, Scirpus lacustris var. glaucus, and Typha spp., forming a vegetation of rather southerly character. The Typha spp., especially T. x glauca appear to have been recently spreading, while Phragmites clones have the appearance of relicts of a formerly more extensive distribution, with no evidence for recent establishment. Dore (1959) arrived at the same conclusion with regard to the present state of this species in southern Quebec. Clones of all these species appear to be very resistant and are thus unlikely to be eliminated by future changes in their environment.

(3) Because of the concentration of settlement along the coast, almost all of the coastal forest was cleared excepting only areas of boggy to heathy black spruce forest. Thus at the peak of settlement, between about 1850 and 1900, coastal marshes were used for hay production in either their natural state or reclaimed, and bordered on cleared arable upland or onto low, swampy areas managed as hay meadows. Due to its intricate topography, the Jourimain area can be assumed to have had a diversified pattern of coastal forest edge flora and vegetation. Remnants of this coastal forest edge survive to the present. Twenty-two rare species (52% of total) are confined to these remnants of coastal forest edge conditions.

(3a) Transition from upland hardwood forest to dune; at the western end of Jourimain Island. A forest relict with red maple, paper birch, red oak, and white ash, with outer shrub fringe of chokecherry and bush honeysuckle. It includes several interesting, if not rare species, including, Aster cordifolius, and Athyrium thelypteroides. Rare plants include, Botrychium dissectum within the forest, Angelica lucida and Rhus radicans in the forest edge, and Hieracium canadense in the nearby dune.

(3b) Transition from upland hardwood forest to salt marsh; on Allen Island, a small marsh island at the northwestern tip of Trenholm Island. Allen Island supports a low "wind and spray pruned" hardwood forest including nine tree species: trembling aspen, large-toothed aspen, grey birch, paper birch, beech, red oak, striped maple, sugar maple, and red maple. This represents the largest diversity of broad-leaved trees per area known to the author from any coastal area in the Maritime Provinces. Shrubs are scarce within this stand and include beaked hazel, wild raisin, and bush honeysuckle. Forest floor vegetation includes Mitchella repens and Oryzopsis asperifolia, and near the edge, Brachyelytrum erectum and Carex deflexa.

Between forest and surrounding brackish marsh there is a wide fringe of shrubs becoming progressively lower outwards. Species of this shrub fringe include bayberry, meadow-sweet, chokecherry, a shadbush species, raspberry, a blackberry species, wild rose, choke-cherry, winterberry, and wild raisin. Several rarities occur within and along the outer edge of this shrub fringe. Apios americana, Rhus toxicodendron, and Angelica lucida each form a continuous belt around the island, while Heracleum lanatum, Polygonum scandens and Teucrium canadense are each represented by a single plant or patch.

(3c) Transition from upland mixed forest to salt marsh; at base of slope below Bayfield cemetery, outside CJNWA. This

appears more floristically altered and impoverished as a result of human activities. Tree species include, red maple, paper birch, and both native and European mountain ash. Forest floor vegetation includes Galium triflorum, Carex leptonervia, and C. deweyana, and the introduced Convallaria majalis, all indicative of relatively rich soil. Near the forest edge occur three rare plants: Angelica lucida, Rhus radicans, and Parthenocissus inserta. At the marsh edge is a large stand of Phragmites communis.

(3d) Transition from upland mixed forest to sweet gale swamp, to salt marsh; from Upper to Lower Walton Swamp, to the Southwest Marsh. Upper Walton Swamp is located east of the causeway and within the CJNWA. It was largely cleared for hay production, but subsequently it was abandoned and invaded by alders. A small part, next to the causeway was left uncleared. This part includes red maple and a small stand of white cedar (Thuja occidentalis). The ground vegetation in the latter appears floristically impoverished as compared to the cedar area in the Upper Trenholm Swamp. The rare Viola conspersa occurs north of the cedar swamp. An isolated population of Caltha palustris is found in the transition from oldfield alder swamp to swamp forest, from the tidehead landwards, along the stream draining northeastwards into the Southeast Marsh.

Lower Walton Swamp extends from the causeway northward to the Southwest Marsh. It is outside of the CJNWA but borders onto it both in the southeast and in the north. Its marginal, landward portion is a swamp forest with prominent red maple and along the southwestern edge some yellow birch, but throughout without white cedar. The rare Osmunda regalis occurs extensively, and along the southwestern edge only, the rare Polygonum arifolium and the orchids Habenaria hyperborea and H. psycodes.

The central part of Lower Walton Swamp is a treeless sweet

gale swamp. The composition of vegetation indicates a, for the Maritime Provinces, rather unusual wetland habitat, combining nutrient (nitrogen and/or phosphorous?) levels too low for strong development of Typha, Phragmites, or Scirpus lacustris, combined with pH and/or slight brackishness too high for acid-adapted plants such as sphagnum mosses and heath shrubs. This habitat includes several rarities, especially in patches of low vegetation between Myrica gale shrubs. These include Osmunda regalis (near upland edge), Calamagrostis neglecta, Muhlenbergia glomerata, Carex diandra, C. viridula, Liparis loeselii, and Galium labradoricum.

(3e) Transition from swamp forest to salt marsh; from Upper Trenholm Swamp to Lower Trenholm Swamp, to salt marsh east of Peacock Cove.

Upper Trenholm Swamp extends from the Trenholm Road southeastwards. The part within the CJNWA, as described in Place Names section, is assumed to have been previously disturbed, due to its proximity to cleared agricultural land. The part of Upper Trenholm Swamp outside of CJNWA and to the west of the causeway, is an important example of a relatively natural and undisturbed red maple to white cedar swamp forest. The tree stratum contains, in addition, considerable yellow birch and white ash, together with some black ash, tamarack, and white pine. As in the Upper Walton cedar swamp, the forest floor is strongly hummocky. Dominants of the vegetation are Taxus canadensis, Osmunda cinnamomea, O. regalis, and Smilacina trifolia. Other plants include, the orchid Corallorhiza trifida.

The Lower Trenholm Swamp extends from the Trenholm Road, westward to the tidehead near Peacock Cove. Its vegetation is a red maple swamp forest. Its flora is quite different from the Upper Trenholm Swamp, and more similar to the wooded part of Walton Swamp. It is indicative of a more nutrient-rich and less acidic soil. White cedar, yellow birch, Taxus, and Smilacina

are lacking or less prominent. Instead, there is extensive occurrence of Rhus radicans, Polygonum arifolium, and a localized population of Caltha palustris.

2. Plant Cover and History

Apart from the occurrence of rare plants and plant communities, the whole of CJNWA is of great interest as an illustration of the historical dimension of the present coastal landscape. Exposures of fossil salt marsh surfaces seaward of the present beach and continuing coastal erosion along dune and uplands illustrate rising sea levels and retreating coast line. Most of the salt marsh is low and wet, dotted with ponds, dissected by creeks, and approaching in places a floating mat condition, and gives the appearance of being gradually drowned by a rise in sea level which is too fast to allow sedimentation rates in salt marsh areas to keep up. Rising sea levels may also have contributed to man's retreat and final abandonment of the marsh areas as illustrated by the various dyke remains.

The upland portion of CJNWA contains old field patterns, house sites, and a diversity of vegetation which can be related to differences in degree, kind, and duration of former land use. Plant communities on well-drained upland sites range from, natural hardwood forest with shrub fringe, through the second-growth spruce-fir forest with hardwood relicts, to a diversity of old field forest, shrub, and meadow communities. Adding to the interest is the past ice-boat terminal and the abortive causeway of 1965/66 which provides an interesting example of recent plant colonization and succession, besides adding to the diversity of vegetation pattern and creating a habitat for several rare plant species through impounding of marsh areas.

CONCLUSIONS

1. Recommendations for special protection of flora, vegetation, and landscape pattern within CJNWA.

(1) Cape Jourimain is an unique and important area, deserving of its status as a National Wildlife Area. This is due to its great diversity of plant and animal communities, including many rare plant species, and because of the present landscape features. The area also reveals examples of a rich and complex natural and human history, much of which remains to be studied. With regard to a possible "fixed link", it is recommended that disturbance of the area be minimized and restricted to the existing Public Works Canada right-of-way.

(2) It is recommended that the part of CJNWA to the west of the causeway be designated as an ecological reserve in the Management Plan for the NWA. This area includes the two relicts of natural hardwood forest and forest edge at the western tip of Jourimain Island, and on Allen Island, and an intricate and diversified complex of dune and salt marsh ecosystems. This area contains 35 of the 45 rare species within CJNWA. It also includes the most important bird nesting habitat areas, including the two impoundments and the Southwest Marsh. Contained within this area is an ancient harbour and marsh road complex which has yet to be explored.

(3) It is recommended that every effort be made to secure protection for Lower Walton Swamp, and Upper and Lower Trenholm Swamp, together with the area of moist black spruce forest between Lower Walton Swamp and Upper Trenholm Swamp. It would be highly desirable to afford protection to this diversity of natural swamp forest vegetation, and to the sequence of habitats from the swamp forest adjacent to the treeless sweet gale swamp (i.e. Lower Walton Swamp), through the slightly brackish marsh, salt marsh, dune and

beach vegetation, located in the southwestern part of CJNWA.

Such an extension would protect an additional nine rare species, for a total of 44 to the west of the causeways.

(4) It is recommended that, independent of their state of ownership, the areas mentioned in (3) be protected against by any disturbances, as a result of possible "fixed link" construction.

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APPENDIX A. List of Flora and Vegetation

Scientific Names	Common English	Common French
EQUISETACEAE		
Equisetum arvense L.	Common Field-horsetail	Queue de renard
Equisetum sylvaticum L.	Wood-horsetail	Prêle des bois
LYCOPODIACEAE		
Lycopodium annotinum L. var. annotinum var. acrifolium Fern.	Stiff Clubmoss	
Lycopodium clavatum L.	Common or Running Clubmoss	Courants verts
Lycopodium complanatum L. var. flabelliforme Fern.	Ground Cedar	
Lycopodium obscurum L. var. obscurum var. dendroideum(Michx.)Eat.	Flat-branch Ground-Pine	Lycopode foncé
OPHIOGLOSSACEAE		
* Botrychium dissectum Spreng.	Moonwort, Grape-fern	Botryche
OSMUNDACEAE		
Osmunda cinnamonea L.	Cinnamon Fern	Osmonde cannelle
Osmunda claytoniana L.	Interrupted Fern	Osmonde de Clayton
* o Osmunda regalis L.	Royal Fern	Osmonde royale
POLYPODIACEAE		
Athyrium filix-femina (L.) Roth var. michauxii (Spreng.) Farw.	Lady-Fern	Fougère femelle
Athyrium thelypteroides (Michx.) Desv.	Silvery Spleenwort	Athyrie argentée
Dennstaedtia punctilobula (Michx.) Moore	Hay-scented Fern	Fougère foin
* Dryopteris austriaca (Jacq.) Woynar var. austriaca -var. intermedia (Muhl.)Morton -var. spinulosa (Muell.) Fiori	Shield-Fern	
o Dryopteris cristata (L.) Gray	Crested Wood-fern	Drypotéride accrêtée
o Gymnocarpium dryopteris (L.) Newm.	Oak Fern	Dryoptéride disjointe
Onaclea sensibilis L.	Sensitive Fern	Onaclée délicate
Pteridium acquilinum L. Kuhn	Bracken Fern	Fougère d'aigle Grande Fougère
o Thelypteris noveboracensis (L.) Nieuwl.	New York Fern	Dryoptéride de New York
Thelypteris palustris (Salisb.) Schott	Marsh Fern	Thélyptéride des marais
o Thelypteris phegopteris (L.) Slosson	Long Beach-Fern	Dryoptéride de Hêtre

TAXACEAE		
°Taxus canadensis Marsh.	Canada Yew, Ground-hemlock	If du Canada, Buis de sapin
PINACEAE		
Abies balsamea (L.) Mill.	Balsam Fir	Sapin baumier
Laris laricina (DuRoi) Koch	Tamarack, American Larch	Mélèze, Tamarac
Picea glauca (Moench) Voss	White Spruce	Épinette blanche
Picea mariana (Mill.) BSP.	Black Spruce	Épinette noire
Picea rubens Sarg.	Red Spruce	Épinette rouge
Pinus strobus L.	White Pine	Pin blanc
*Thuja occidentalis L.	White Cedar	Cédre ou Balai
TYPHACEAE		
Typha angustifolia L.	Narrow-leaved Cat-tail	Petite Massette
*Typha X glauca Godr.	hybrid	
Typha latifolia L.	Broad-leaved Cat-tail	Grande Massette
ZOSTERACEAE		
*Potamogeton pectinatus L.	Sago Pondweed	Potamot pectiné
Ruppia maritima L.	Ditch Grass	Ruppie
Zostera marina L.	Eelgrass	Mousse de mer
JUNCAGINACEAE		
Triglochin maritima L.	Arrow-grass	Troscart
GRAMINEAE		
Agropyron repens (L.) Beauv.	Witch Grass, Couch Grass	Chiendent
°Agrostis hyemalis (Walt.)BSP.	Hairgrass, Ticklegrass	Foin des fou
Agrostis stolonifera L.	Creeping Bent-grass	Foin follette
Ammophila breviligulata Fern.	Beachgrass	Gourbet ou Oyat
*Brachyelytrum erectum (Schreb.) Beauv.	Bearded Short-husk	
Bromus ciliatus L.	Fringed Brome-grass	Brome cilié
Calamagrostis canandensis (Michx.) Nutt.	Canada Blue-joint	Foin bleu
*°Calamagrostis neglecta (Ehrh.) Gaertn.	Reed, Bent-grass	
Cinna latifolia (Trev.)Griseb.	Wide-leaved Cinna	Cinna à larges feuilles
Danthonia spicata (L.) Beauv.	Common Wild-oat-grass	Avoine du pauvre
*Deschampsia flexuosa (L.)Trin.	Wavy Hair Grass	Cauche
Elymus mollis Trin.	Sea Lyme-grass, Strand Wheat	Seigle de mer
Festuca rubra L.	Red Fescue	Fétuque rouge
°Glyceria striata (Lam.)Hitchc.	Fowl-manna Grass	Foin d'odeur,
Hierchloe odorata (L.) Beauv.	Vanilla, Indian or Sweet Grass	Herbe sainte

Hordeum jubatum L.	Squirreltail	Queue d'écureuil
*°Muhlenbergia glomerata (Willd.) Trin.	Agglomerated Muhlenbergia	Muhlenbergie agglomerée
* Oryzopsis asperifolia Michx.	Rough Mountain-Rice	
Phalaris arundinacea L.	Reed Canary-grass	Phalaride vivace
Phleum pratense L.	Common Timothy	Mil
* Phragmites australis (Cav.) Trin.	Reed, Cane Grass	Roseau commun
Poa compressa L.	Canada Bluegrass	Pâturin
Poa palustris L.	Swamp Meadow-grass	Pâturin des marais
Poa pratensis L.	Kentucky Bluegrass	Foin à vaches
Pucinellia spp.	Alkali-grass spp.	Puccinellie
Spartina alterniflora Loisel.	Salt-water Cord Grass	Herbe salée
Spartina patens (Ait.) Muhl.	Salt-meadow Grass	Musotte
Spartina pectinata Link	Fresh-water Cord Grass, Slough Grass	Chaume, Herbe à liens

CYPERACEAE

Carex arctata Boott	Sedge sp.	Laiche
Carex brunnescens (Pers.) Poir	Sedge sp.	Laiche
Carex canescens L.	Sedge sp.	Laiche
°Carex crinita Lam.	Sedge sp.	Laiche
*Carex deflexa Hornem.	Sedge sp.	Laiche
°Carex deweyana Schw.	Sedge sp.	Laiche
*°Carex diandra Schrank	Sedge sp.	Laiche
Carex disperma Dewey	Sedge sp.	Laiche
Carex hormathodes Fern.	Sedge sp.	Laiche
Carex intumescens Rudge	Sedge sp.	Laiche
°Carex leptonervia Fern.	Sedge sp.	Laiche
°Carex lurida Wahl.	Sedge sp.	Laiche
*Carex mackenziei Krecz.	Sedge sp.	Laiche
°Carex novae-angliae Schw.	Sedge sp.	Laiche
Carex paleacea Wahl.	Sedge sp.	Laiche
Carex silicea Olney	Sedge sp.	Laiche
°Carex stipata Muhl.	Sedge sp.	Laiche
Carex trisperma Dewey	Sedge sp.	Laiche
*°Carex viridula Michx.	Greenish Sedge	Carex verdâtre
Eleocharis halophila Fern. & Brack.	Spike-rush sp.	Eleocharide
Eleocharis parvula (R.& S.) Link	Spike-rush sp.	Eleocharide
°Eleocharis sp. (E. palustris gr.)	Spike-rush sp.	Eleocharide
°Eriophorum angustifolium Honckeny	Spike-rush sp.	Eleocharide
°Eriophorum virginicum L.	Cotton-grass sp.	Linaigrette
*Scirpus americanus Pers.	American Bulrush	Scirpe d'Amérique
Scirpus atrocinctus Fern.	Bulrush sp.	Scirpe
Scirpus cyperinus (L.) Kunth	Wool-grass	Scirpe souchet
Scirpus lacustris L. var. glaucus (Sm.) Hartm.	Bulrush sp.	Scirpe
Scirpus maritimus L.	Saltmarsh Bulrush	Scirpe de marais saline
Scirpus microcarpus Presl.	Bulrush sp.	Scirpe

ARACEAE		
°Arisaema stewardsonii Britt.	Jack-in-the-pulpit	Petit Prêcheur
JUNCACEAE		
Juncus balticus Willd.	Baltic or Bog Rush	Jonc de la Baltique
Juncus bufonius L.	Toad Rush	Jonc des crapauds
°Juncus canadensis Gay	Canada Rush	Jonc du Canada
Juncus effusus L.	Rush sp.	Jonc
Juncus gerardii Loisel.	Rush sp.	Jonc
Juncus tenuis Willd.	Rush sp.	Jonc
Luzula multiflora (Retz.)Lejeune	Wood-Rush sp.	
LILIACEAE		
Clintonia borealis (Ait.) Raf.	Bluebead-Lily	Lis boréale
°Convallaria majalis L.	Lily-of-the-Valley	Muguet
Maianthemum canadense Desf.	Wild Lily-of-the -Valley	Muguet
Medeola virginiana L.	Indian Cucumber-root	Concombre sauvage
°Smilacina racemosa (L.)Desf.	False Solomon's Seal	Faux Sceau-de-Salomon
°Smilacina trifolia (L.)Desf.	Three-leaved False Solomon's Seal	Faux Sceau-de-Salomon
°Streptopus amplexifolius (L.) DC.	Liverberry, Scootberry	
Streptopus roseus Michx.	Rose Twisted-stalk	Rognons de coq
°Trillium undulatum Willd.	Painted Trillium	Trille
IRIDACEAE		
Iris versicolor L.	Blue Flag, Wild Iris	Clajeux ou Iris sauvage
ORCHIDACEAE		
°Corallorhiza trifida Chat.	Early or Pale Coral-root	
Cypripedium acaule Ait.	Pink Lady's Slipper	Sabot de la vierge
°Habenaria hyperborea (L.)R.Br.	Northern Green Orchis	
°Habenaria psycodes (L.) Spreng.	Small Purple Fringed Orchis	
*°Liparis loeselii L. Richard	Bog-twayblade or Yellow Twayblade	Liparis de Loesel
SALICACEAE		
Populus balsamifera L.	Balsam-Poplar	Liard
Populus grandidentata Michx.	Large-toothed Aspen	Peupliers à grandes dents
Populus tremuloides Michx.	Trembling Aspen	Peuplier de Tremble
Salix bebbiana Sarg.	Long-beaked Willow	Chaton, Petit Minou

Salix discolor MUhl.	Pussy-willow	Chaton, Petit Minou
Salix fragilis L.	Crack-Willow	Saule
Salix lucida Muhl.	Shining Willow	Saule
MYRICACEAE		
Myrica gale L.	Sweet Gale	Bois-sent-bon ou Piment royal
Myrica pensylvanica Loisel.	Bayberry	
BETULACEAE		
Alnus crispa (Ait.) Pursh.	Green Alder	Aulne vert
Alnus rugosa (DuRoi) Spreng.	Speckled Alder	Verne ou Aulne blanchâtre
°Betula lutea Michx. f.	Yellow Birch	Merisier
Betula caerulea-grandis Blanch.	Birch hybrid	Bouleau
Betula papyrifera Marsh. var. cordifolia (Regal) Fern. var. papyrifera Marsh.	Paper, White Birch	Bouleau blanc
Betula populifornia Marsh.	Grey, Fire Birch	Bouleau rouge, gris
Corylus cornuta Marsh.	Beaked Hazelnut	Noisetier
FAGACEAE		
Fagus grandifolia Ehrh.	Beech	Hêtre
Quercus rubra L.	Northern Red Oak	Chêre rouge
POLYGONACEAE		
*°Polygonum arifolium L.	Halberd-leaved Tearthumb	
Polygonum cuspidatum Sieb. & Zucc.	Japanese Knotweed	Bambou
* Polygonum ramosissimum Michx.	Bushy Knotweed	Renouée
Polygonum sagittatum L.	Arrow-leaved Tearthumb	Gratte-cul ou Renouée sagitée
**Polygonum scandens L.	Climbing False Buckwheat	Renouée grimpante
Polygonum (sect. Avicularia)	spp. Knotweed	Traînasse
Rumex acetosella L.	Common, Sheep Sorrel	Oseille ou Surette
Rumex crispus L.	Yellow, Curled Dock	Reguette ou Rumex crépu
* Rumex maritimus L. var. fueginus (Phil.) Dusen	Golden Dock	Rumex fausse-persicaire
°Rumex orbiculatus Gray	Great Water-Dock	Rumex orbiculaire
CHENOPODIACEAE		
* Atriplex laciniata L.	Orache sp.	Arroche
Atriplex spp.	Orache or Spearscale spp.	Arroche
Chenopodium spp.	Goosefoot spp.	Ansérine
Salicornia europaea L.	Glasswort, Samphire	Corail
* Salsola kali L. var. kali	Common Saltwort	Soude roulante
Sueda americana spp.	Sea-blite	

CARYOPHYLLACEAE		
Arenaria lateriflora L.	Grove-sandwort	Sabline latériflore
Arenaria peploides L.	Seabeach-sandwort	Sabline faux-péplus
Spergula arvensis L.	Corn-spurrey, Stickwort	Grippe
Spergularia canadensis (Pers.) Don	Canada Sand-spurrey	Spergulaire du Canada
Spergularia marina (L.)Griseb.	Purple Sand-spurrey	Spergulaire rouge
Stellaria graminea L.	Common Stitchwort	Mouron des champs
NYMPHAEACEAE		
**Brasenia schreberi Gmel.	Water-shield, Purple Wen-dock	
RANUNCULACEAE		
Actaea rubra (Ait.)Willd.	Red Baneberry	Pain de couleuvre
** Caltha palustris L.	King-cup, Cowslip	Souci d'eau
Coptis trifolia (L.) Salisb.	Goldthread sp.	Coptide
Ranunculus acris L.	Common Buttercup	Bouton d'or
Ranunculus cymbalaria Pursh	Seaside Crowfoot	Renoncule cymbalaire
Thalictrum pubescens Pursh	Tall Meadow -rue King-of-the-meadow	Grand pigamon
CRUCIFERAE		
Cakile edentula (Bigel.) Hook.	Sea-Rocket	Caquillier
Raphanus raphanistrum L.	Wild Radish	Rave sauvage
DROSERACEAE		
Drosera rotundifolia L.	Round-leaved Sundew	Rossolis à feuilles rondes
CRASSULACEAE		
Sedum purpureum (L.)Schultes	Live-forever	Vit-toujours
SAXIFRAGACEAE		
Chrysosplenium americanum Schwein.	Water-mat, Water-carpet	Dorine d'Amérique
Mitella nuda L.	Mitrewort sp.	Mitrelle
Ribes oxyacanthoides L. var. hirtellum(Michx.) Scoggan	Canada, Bristly Gooseberry	Fausse-épine
Ribes lacustre (Pers.)Poir.	Bristly, Swamp Current	Groseillier sauvage
ROSACEAE		
°Amelanchier bartramiana (Tausch) Roemer	Bartram's Shadbush	Amélanchier boréale
Amelanchier spp.	Serviceberry	Poirier ou Amélanchier

Crategus spp.	Hawthorn spp.	Aubépine
Fragaria virginiana Dcne.	Wild Strawberry	Fraisier des champs
°Geum rivale L.	Avens sp.	Benoîte
Potentilla canadensis L.	Old-field-Cinquefoil	
Potentilla egedei Wormsk.	Silverweed	Argentine ou Richette
Potentilla palustris (L.)Scop.	Marsh Cinquefoil	Comaret ou Argentine rouge
Prunus pensylvanica L. f.	Pin-cherry	Cerises d'été
Prunus virginiana L.	Choke Cherry	Cerisier a grappes
Pyrus arbutifolia (L.) L.f.	Red Chokeberry	Aronia
Pyrus malus L.	Apple	Pommier
°Rosa nitida Willd.	Rose sp.	Rosier
Rosa virginiana Mill.	Common Wild Rose	Rosier
Rubus idaeus L. var. strigosus (Michx.) Maxim.	Red Raspberry	Framboisier
*Rubus pensylvanicus Poir	Blackberry sp.	Mûrier
Rubus pubescens Raf.	Dwarf Red Blackberry	Ronce pubescente
Rubus (subgen. Eubatus) spp.	Blackberry spp.	Mûrier
Sorbus americana Marsh.	American Mountain-Ash	Cormier
°Sorbus aucuparia L.	European Mountain-Ash	Cormier
Spiraea alba DuRoi	Meadow-Sweet	Thé du Canada
Spiraea tomentosa L.	Steeple-bush	Reine des prés
LEGUMINOSAE		
** Apios americana Medic.	Groundnut	Patates en chapelet
Lathyrus japonicus Willd.	Beach Pea	Pois en mer
Lathyrus palustris L.	Vetchling, Marsh Pea	Pois de marais
Trifolium arvense L.	Rabbit-foot-Clover, Stone-Clover	Trèfle des champs
Trifolium pratense L.	Red Clover	Trèfle rouge
Trifolium procumbens L.	Low Hop Clover	
Trifolium repens L.	White Clover	Trèfle blanc
Vicia cracca L.	Cow or Tufted Vetch	Jargeau
Vicia sativa L. var. angustifolia (L.) Wahl.	Spring Vetch	Vesce cultivée
* Vicia tetrasperma (L.)Moench	Four-seeded Vetch	Lentillon ou Vesce à quatre graines
OXALIDACEAE		
°Oxalis montana Raf.	Wood-sorrell	Paine de lièvre
EUPHORBIACEAE		
*° Euphorbia polygonifolia L.	Seaside Spurge	Euphorbe
ANACARDIACEAE		
* Rhus radicans L. var. rydbergii (Small) Rehd.	Poison Ivy	Herbe à la puce

AQUIFOLIACEAE		
Ilex verticillata (L.) Gray	Black Alder or Winterberry	Apalanche ou houx verticillé
Nemopanthus mucronata (L.)Trel.	Mountain Holly	Faux houx
ACERACEAE		
Acer pensylvanicum L.	Striped Maple	Bois barré
Acer rubrum L.	Swamp, Red Maple	Plaine rouge
Acer saccharum Marsh.	Sugar or Rock Maple	Erable à sucre
BALSAMINACEAE		
Impatiens capensis Meerb.	Spotted Touch-me-not	Chou sauvage
VITACEAE		
*D Parthenocissus inserta (Kerner) Fritsch.	Virginia Creeper	Vigne-Vierge
HYPERICACEAE		
Hypericum canadense L.	St.-John's-wort sp.	Millepertuis
Hypericum virginicum L.	Marsh St.-John's-wort	Millepertuis de Virginie
VIOLACEAE		
* Viola conspersa Reichenb.	American Dog Violet	Violette décombante
Viola cucullata Ait.	Blue Marsh Violet	Violette
Viola macloskeyi Lloyd	Northern White Violet	Violette
° Viola septentrionalis Greene	Northern Blue Violet	Violette
ONAGRACEAE		
° Circaea alpina L.	Enchanter's Nightshade	
Epilobium angustifolium L.	Fireweed or Great Willow-herb	Bouquets rouges ou Lilas de montagne
Epilobium leptophyllum Raf.	Narrow-leaved Willow-herb	Epilobe à feuille etroites
Oenothera biennis L.	Evening Primrose sp.	Onagre
Oenothera parviflora L.	Evening Primrose sp.	Onagre parviflore
ARALIACEAE		
° Aralia hispida Vent.	Bristly Sarsaparilla	Salsepareille
Aralia nudicaulus L.	Wild Sarsaparilla	Salsepareille
UMBELLIFERAE		
* Angelica lucida L.	Sea-coast Angelica	Céloplèvre brillante
Carum carvi L.	Caraway	Anis Canadien
Cicuta bulbifera L.	Bulb-bearing Water-Hemlock	Cicutaire bulbifère
Cicuta malculata L.	Spotted Cowbane or Musquash-root	Carrotte à Moreau
*Heracleum lanatum Michx.	Cow-parsnip	Berce

Ligusticum scothicum L.	Scotch or Beach Lovage	Persil de mer
Sium suave Walt.	Water-parsnip	Berle
CORNACEAE		
Cornus canadensis L.	Bunchberry	Quatre-temps
Cornus stolonifera Michx.	Red Osier Dogwood	Hart rouge
PYROLACEAE		
Moneses uniflora (L.) Gray	One-flowered Pyrola	
Monotropa uniflora L.	Indian-pipe	Monotrope uniflore
Pyrola elliptica Nutt.	Shinleaf	Pyrole elliptique
Pyrola rotundifolia L. var. americana (Sweet) Fern.		
ERICACEAE		
°Chamaedaphne calyculata (L.) Moench	Leather-leaf	Faux bleuets, Petit-daphné
°Gaultheria hispidula (L.)Muhl.	Creeping Snowberry	Oeufs de perdrix
Gaultheria procumbens L.	Checkerberry, Teaberry	Thé des bois
Gaylussacia baccata (Wang.) Koch	Black Huckleberry	Geules noires
Kalmia angustifolia L.	Lambkill, Sheep Laurel	Crevard de moutons
°Ledum groenlandicum Oeder	Labrador-tea	Thé du Labrador
Oxycoccus macrocarpus (Ait.) Pers.	Large or American Cranberry	Gros Atocas
Rhododendron canadense L. Torr.	Rhodora	Rhododendron du Canada
Vaccinium angustifolium Ait. var. laevifolium House	Low or Sweet Blueberry	Bleuets
Vaccinium myrtilloides Michx.	Velvet-leaf Blueberry	Bleuets
PRIMULACEAE		
Glaux maritima L.	Saltwort, Sea-Milkwort	Glaux maritimus
Lysimachia terrestris (L.)BSP.	Yellow Loosestrife	Lysimaque terrestre
°Lysimachia thyrsiflora L.	Tufted Loosestrife	Corneille en bouquet
Trientalis borealis Raf.	American Starflower	Trientale boréale
PLUMBAGINACEAE		
Limonium carolinianum (Walt.) Britt.	Sea-Lavender or Marsh-Rosemary	Lavande de mer
OLEACEAE		
Fraxinus americana L.	White Ash	Frêne blanc
°Fraxinus nigra Marsh.	Black Ash	Frêne noir
GENTIANACEAE		
*Centaurium pulchellum (Sw.)Druce	Centaury	

CONVOVULACEAE		
Convovulus sepium L.	Hedge-Bindweed or Wild Morning Glory	Gloire du matin ou Liseron des haies
LABIATAE		
Lycopus americanus Muhl.	Cut-leaved Water-Horehound	Lycope d'Amerique
Lycopus uniflorus Michx.	Northern Bugleweed	Lycope uniflore
°Mentha arvensis L.	Common Mint	Menthe du Canada
°Prunella vulgaris L.	Heal-all	Herbe à charpentier
Scutellaria epilobiifolia Hamilton	Common Skullcap	Toque ou Tertianaire
Scutellaria lateriflora L.	Mad-dog Skullcap	
*Teucrium canadense L.	Wood-sage or American Germander	Germandrée du Canada
SOLANACEAE		
Solanum dulcamara L.	Bittersweet-Nightshade	Morelle douce-amère
SCROPHULARIACEAE		
Euphrasia spp.	Eyebright spp.	
Linaria vulgaris Hill	Butter-and-eggs or Common Toadflax	Geuele de lion
Melampyrun lineare Desr.	Cow-wheat	
*Odontites serotina (Wettst.) Dum.	Red Bartsia	
Veronica officinalis L.	Common Speedwell	Thé d'Europe
**Veronica peregrina L. var. xalapensis (HBK.) St. John & Warren	Purslane-Speedwell	Véronique voyageuse
PLANTAGINACEAE		
Plantago major L.	Common Plantain	Grand Plantain
Plantago maritima L.	Seaside-plantain	Plantain ou Queue de rat
RUBIACEAE		
**°Galium labradoricum Wieg.	Bog Bedstraw or Cleavers	Gaillet
Galium mollugo L.	White Bedstraw	Gaillelait
°Galium palustre L.	Marsh Bedstraw	Gaillet palustre
Galium trifidum Michx.	Dyer's Cleavers or Small Bedstraw	Tissavoyanne rouge
°var. trifidum		
var. halophilum Fern.&Wieg.		
*Mitchella repens L.	Partridge-berry	Pain de perdrix
CAPRIFOLIACEAE		
Diervilla lonicera Mill.	Bush-Honeysuckle	Herbe bleu
Linnaea borealis L.	Twinflower	Linnée boréale
°Lonicera canadensis Bartr.	Fly-Honeysuckle	

Lonicera tatarica L.	Tatarian Honeysuckle	Chèvrefeuille
°Sambucus racemosa L. var. pubens (Michx.) Koehne	Red-berried Elder	Sureau rouge
Viburnum cassinoides L.	Witherod or Wild-raisin	Alisier ou Bluets sains
Viburnum opulus L. var. opulus	Guelder-Rose	Rose de Gueldre
COMPOSITAE		
Achillea millefolium L.	Common Yarrow or Milfoil	Herbes à dindes
Ambrosia artemisiifolia L.	Common Ragweed	Petite herbe à poux
Anaphalis margaritacea (L.) Clarke	Pearly Everlasting	Immortelle
Arctium minus (Hill.) Bernh.	Common Burdock	Tabac du diable
Aster acuminatus Michx.	Whorled Wood Aster	Aster acuminé
Aster cordifolius L.	Heart-leaved Aster	
Aster macrophyllus L.	Large-leaved Aster	
Aster novi-belgii L.	New York Aster or New Belgium Aster	Aster de la Nouvelle-Belgique
°Aster puniceus L.	Purple-stemmed Aster	
°Aster radula Ait.	Rough Aster	Aster rude
*** Aster subulatus Michx. var. obtusifolius Fern.	Annual Salt-marsh Aster	
Aster umbellatus Mill.	Umbellate or Flat-topped White Aster	Aster à ombelles
Bidens frondosa L.	Large-leaved Beggar-ticks	Bident feuillu
Chrysanthemum leucanthemum L.	Ox-eye-Daisy	Marguerite
Cichorium intybus L.	Blue Sailors	Chicorée
Cirsium arvense (L.) Scop.	Canada Thistle	Chadron, Chaudron
Cirsium muticum Michx.	Swamp Thistle	Chadron, Chaudron
Cirsium vulgare (Savi) Tenore	Bull Thistle	Piqueux ou Gros Chardon
Eupatorium purpureum L. var. maculatum (L.) Darl.	Spotted Joe-Pye-weed	Eupatoire maculée
Gnaphalium uliginosum L.	Low Cudweed	
** Hieracium canadense Michx. var. canadense	Canada Hawkweed	Épervière
Hieracium pilosella L.	Mouse-ear Hawkweed	Oreille de souris
Hieracium pratense Tausch	King Devil or Field Hawkweed	Épervière des pres
°Hieracium scabrum Michx.	Rough Hawkweed	Épervière
Lactuca biennis (Moench) Fern.	Tall Blue Lettuce	Laitue bisannuelle
Lactuca canadensis L. var. canadensis	Devil's Weed	Chicorée blanche
Leontodon autumnalis L. var. autumnalis	Fall Dandelion	Leontodon d'automne
Matricaria maritima L.	Scentless Chamomide	Matricaire inodore
Matricaria matricaroides (Less.) Porter	Pineapple Weed	Matricaire suave
Prenanthes altissima L.	White Lettuce	Laitue blanc

Prenanthes trifoliata (Cass.) Fern.	Lion's Paw or Gall-of-the-earth	Prenanthes trifoliolée
Senecio sylvaticus L.	Groundsel, Ragwort	Séneçon
Senecio viscosus L.	Stinking or Sticky Groundsel	Senéçon visqueux
Solidago canadensis L.	Canada Goldenrod	Bouquets jaunes
* Solidago X erskinei Boivin	Goldenrod hybrid	Verge d'or
Solidago graminifolia (L.) Salisb.	Narrow-leaved Goldenrod	Verge d'or graminifoliée
Solidago puberula Nutt.	Downy Goldenrod	Verge d'or pubérulante
Solidago rugosa Ait.	Rough-stemmed Goldenrod	Verge d'or rugeuse
Solidago sempervirens L.	Seaside Goldenrod	Verge d'or toujours verte
Solidago uglinosa Nutt.	Bog Goldenrod	Verge d'or des marais
Sonchus arvensis L.	Field-sow-thistle	Laiteron des champs
Tanacetum vulgare L.	Common Tansy	Tanaisie commune
Taraxacum officinale Weber	Common Dandelion	Dent-de-lion
* Xanthium strumarium L.	Cocklebur, Clotbur	Lanpourde

Appendix B. Rare Plant Data Sheets

* *Angelica lucida* L.; syn. *Coelopleurum lucidum* (L.) Fern. B1

** *Apios americana* Medic. B2

*** *Aster subulatus* Michx. var. *obtusifolius* Fern. B3

* *Atriplex laciniata* L.; syn. *A. sabulosa* Rouy B4

* *Botrychium dissectum* Spreng. B5

* *Brachyelytrum erectum* (Schreb.) Beauv. B6

** *Brasenia schreberi* Gmel. B7

* *Calamagrostis neglecta* (Ehrh.) Gaertn.; syn. *C. stricta* (Timm.) Koel B8

** *Caltha palustris* L. B9

* *Carex deflexa* Hornem. B10

* *Carex diandra* Schrank B11

* *Carex mackenziei* Krecz B12

* *Carex viridula* Michx. B13

* *Centaurium pulchellum* (Sw.) Druce B14

* *Deschampsia flexuosa* (L.) Trin. B15

* *Dryopteris austriaca* (Jacq.) Woynar var. *austriaca* . . . B16

* *Euphorbia polygonifolia* L. B17

** *Galium labradoricum* Wieg. B18

* *Heracleum lanatum* Michx. B19

** *Hieracium canadense* Michx. B20

* *Liparis loeselii* (L.) Richard B21

* *Mitchella repens* L. B22

* *Muhlenbergia glomerata* (Willd.) Trin. B23

* *Odontites serotina* (Lam.) Dum. B24

* *Oryzopsis asperifolia* Michx. B25

* Osmunda regalis L. B26

* Parthenocissus inserta (Kerner) Fritsch B27

* Phragmites australis (Cav.) Trin. B28

* Polygonum arifolium L. B29

* Polygonum ramosissimum Michx.; syn.: P. exsertum Small . B30

** Polygonum scandens L. B31

* Potamogeton pectinatus L. B32

* Rhus radicans L. var. rydbergii (Small) Rehd.. . . . . B33

* Rubus pensilvanicus Poir. B34

* Rumex maritimus L. var. fueginus (Phil.) Dusen B35

* Salsola kali L. var. kali B36

* Scirpus americanus Pers. B37

* Solidago X erskinei Boivin. (S. canadensis X S. sempervirens) B38

* Teucrium canadense L. B39

* Thuja occidentalis L. B40

* Typha angustifolia L. B41

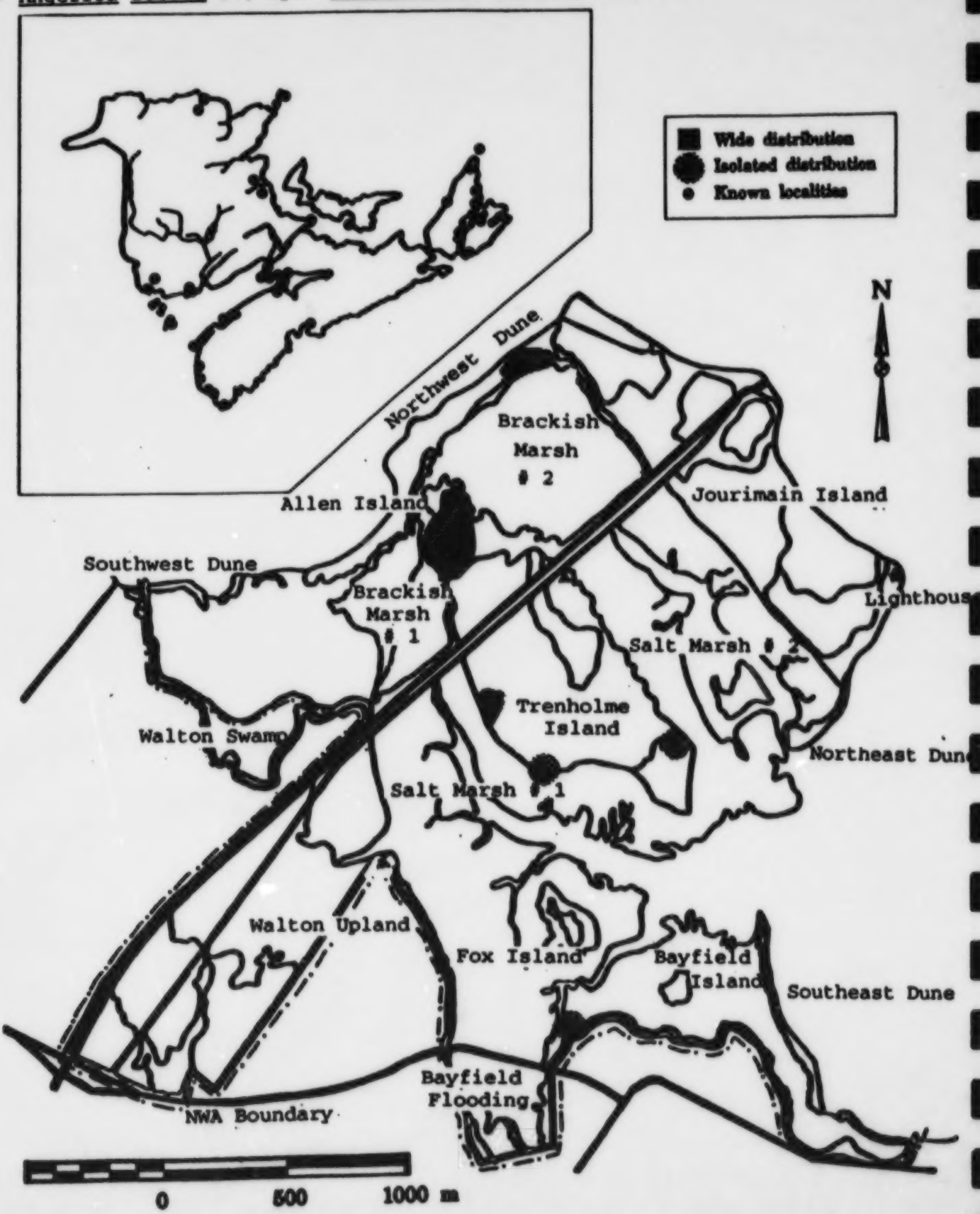
** Veronica peregrina L. B42

* Vicia tetrasperma L. Moench. B43

* Viola conspersa Reichenb. B44

* Xanthium strumarium L. B45

* Angelica lucida L.; syn. Coelopleurum lucidum (L.) Fern.



* Angelica lucida L.; syn. Coelopleurum lucidum (L.) Fern.

Maritime Provinces: In N.S., scattered along the coast but not reported from the North Shore. On. P.E.I., only one locality at Wood Island, Queen's Co. In N.B., scattered along the coasts; for the East Coast the only localities on Miscou Island, Gloucester Co. and in the Kouchibouguac Park area, Kent Co.

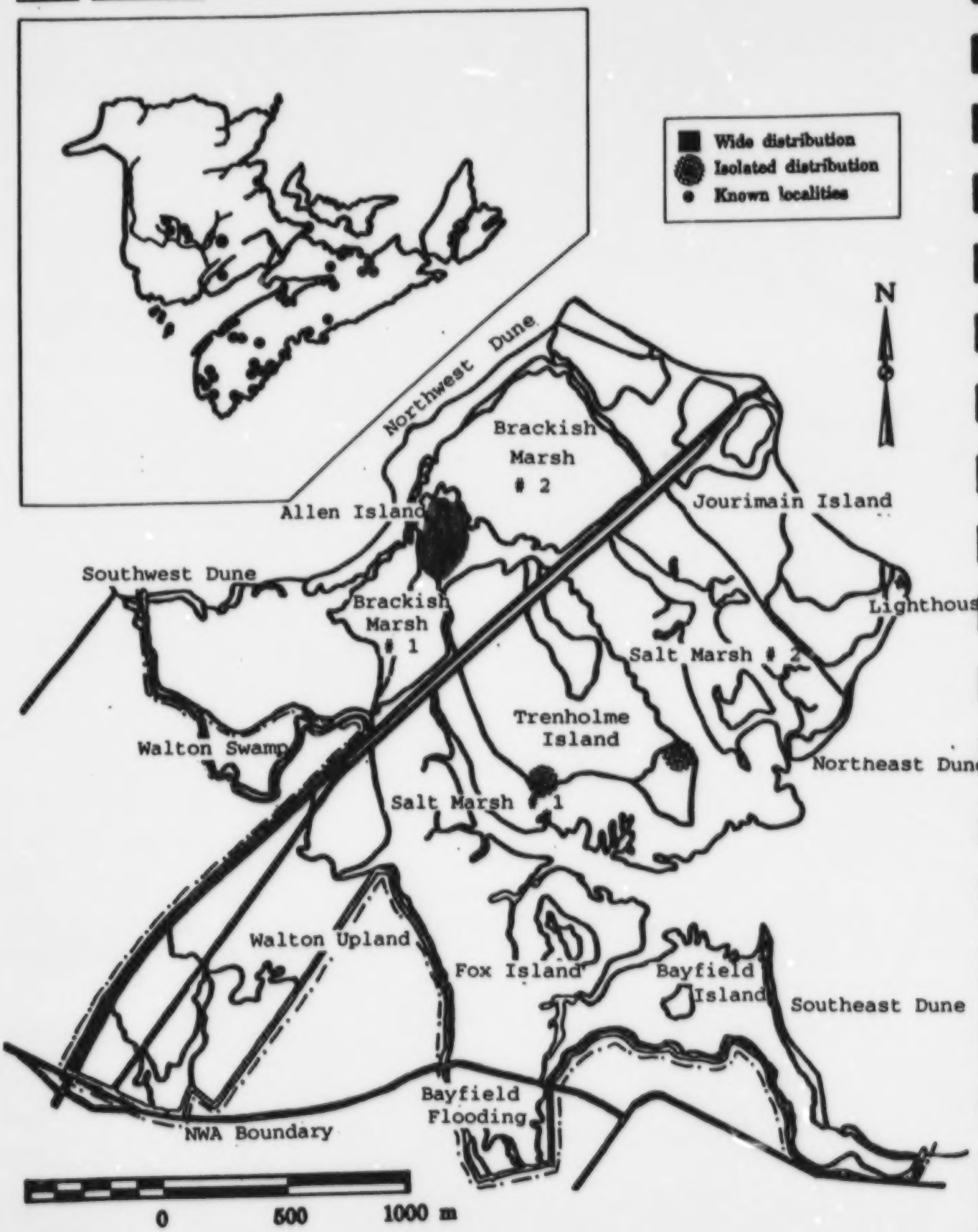
CJNWA: Nine isolated colonies in the transition between salt marsh and well-drained uplands. Largest colony at Allen Island, including adjacent smaller marsh island and northwestern tip of Trenholm Island. Here common and extending from the forest edge across the shrub belt into the upper fringe of the saltmarsh with dominant Spartina pectinata. Habitat overlaps that of Rhus radicans, with which it is frequently associated, but it extends further into the forest edge and less far into the salt marsh fringe. There is also one colony on the Northwest Dune (880821-01).

Other records from Tormentine Peninsula: Found northeast of Ephraim Island in salt marsh fringe with Juncus balticus, Spartina pectinata, and Festuca rubra (1975). Also found southwest of Shemogue Head and southwest of Cadman Corner.

Maritime Habitat: Coastal headlands, moist meadows, and thickets, and gravelly seashores.

Eastern N.A. Range: Native. Found from Long Island and Rhode Island to Labrador (Hopedale, 55 27' N.).

** Apios americana Medic.



** Apios americana Medic.

Maritime Provinces: In N.S., with sharply defined range; common in the southwestern part and extending through central Nova Scotia to near Northumberland Strait between Tatamagouche and New Glasgow; occurring in the northern part of its range on alluvial soils along rivers. "Does appear to be absent in Cumberland Co. and from Halifax and central Pictou Co. eastward". On P.E.I., apparently lacking (Erskine, 1985; Scoggan, 1978), but shown to be present on a map by Fassett (1939:127). In N.B., with extensive but isolated range in the lower St. John River area and an isolated occurrence on the East Coast in Kouchibouguac Park, Kent Co.

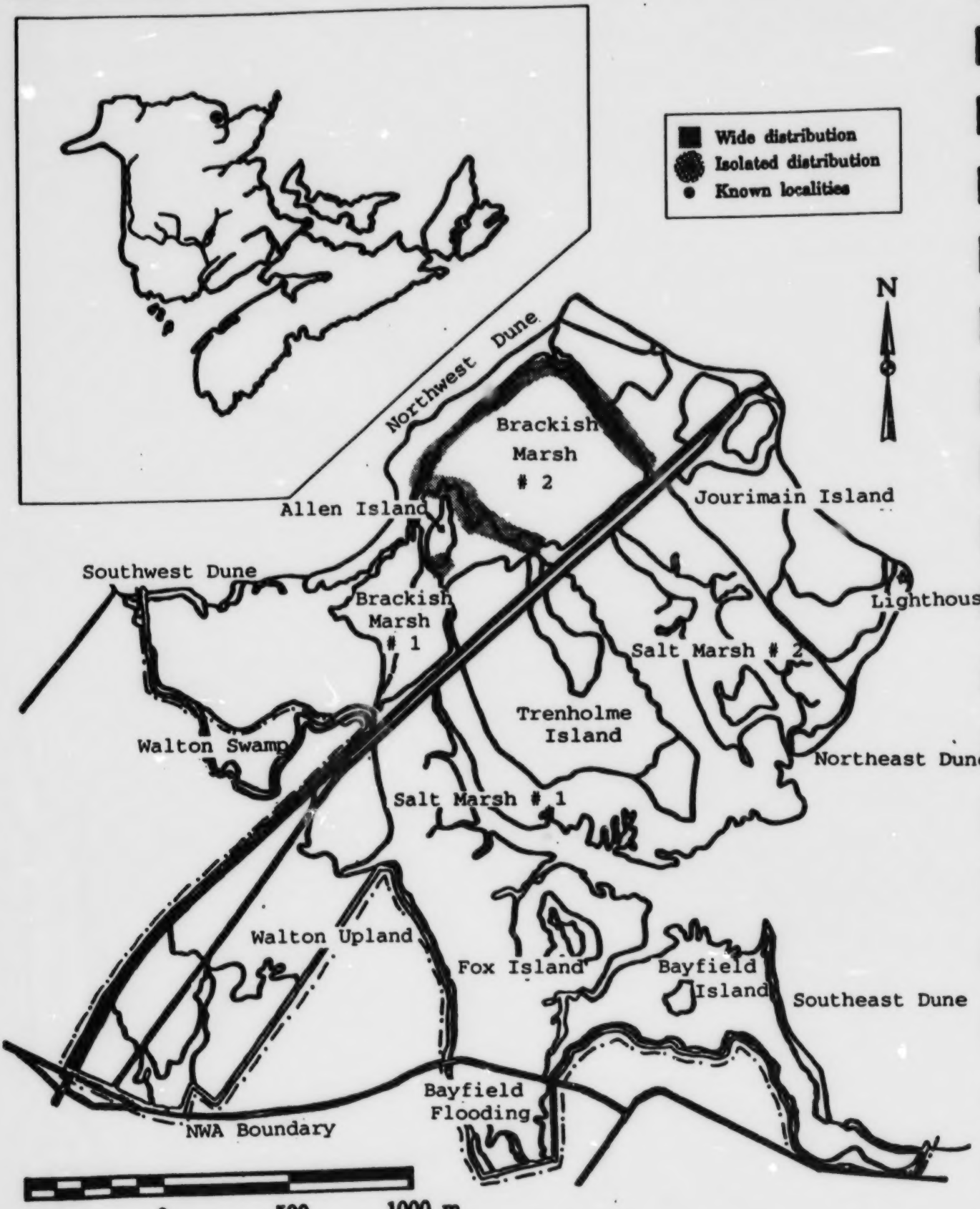
CJNWA: Large colony at Allen Island, including adjacent smaller marsh island. Here dominant throughout in the shrub fringe between the hardwood forest and surrounding salt marsh in association with Rhus radicans and Angelica lucida. Extends in places, marginally, into the upper fringe of the salt marsh, but less far than the other two more widely distributed spp. (880820-01). (Discovered in this locality in 1973).

Other records from Tormentine Peninsula: Between Cape Spear and Cape St. Laurent west of Oulton Brook a single small patch on coastal bluff just outside forest edge (860928-01). Another small patch occurs further east, near the Oulton Brook (890916-05).

Maritime Habitat: Alluvial soils: woods, thickets, and shores.

General Range: Native. Southern. Found from Florida to mainland Nova Scotia, southern New Brunswick and Quebec City area.

*** Aster subulatus Michx. var. obtusifolius Fern.



*** Aster subulatus Michx. var. obtusifolius Fern.

Identification: Identified as this variety by its subequal phyllaries and the long ligules which clearly exceed the phyllaries in length. The statement by Hinds (1986) that the Gloucester Co. plants are actually A. laurentianus which have been misidentified is difficult to understand because of the prominent ligules which Fernald (1950) reports as being typical for var. obtusifolius while in A. laurentianus ligules are lacking or rudimentary. (See Appendix C)

Maritime Provinces: The variety appears to be endemic to the Gulf of St. Lawrence coast of New Brunswick with published records from Bathurst and Tetagouche River in Gloucester Co. (Scoggan, 1979). Typical A. subulatus (var. subulatus) extends northward along the U.S. East Coast to Berwick, Maine (Seymour, 1969).

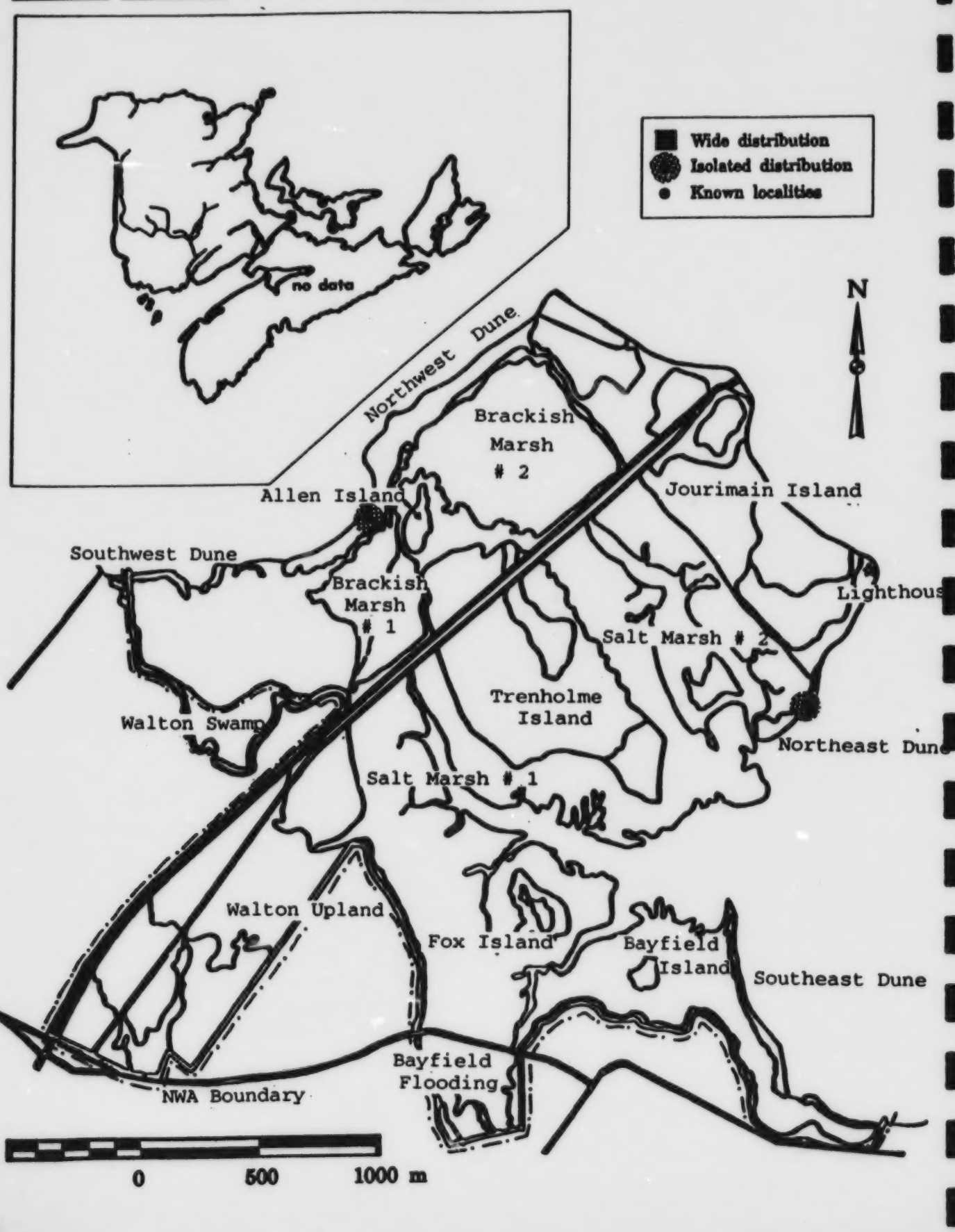
CJNWA: One extensive colony around Brackish Marsh # 2. Within this area, locally frequent and even dominant. In 1988, found mainly in the highly nutrient-enriched zone along the shore of the impoundment between the narrow Spartina alterniflora fringe, along the waters edge, and the luxurious Spartina pectinata community landwards. Occasionally found as dwarfed specimens in car tracks, in sparse Juncus gerardi vegetation, between the lush vegetation along the impoundment and the edge of the dune. Appeared to have become more common by 1989. Prominent within salt marsh fringing the impoundment to the west, in wet depressions with recently dead or decadent Scirpus maritimus or Spartina alterniflora. The Aster subulatus colony in CJNWA was discovered by H. Hinds earlier in 1988. The taxon had not been observed during visits to the area in 1973 to 1975 by H. Harries (880818-06).

Other records from Tormentine Peninsula: None.

Maritime Habitat: Fresh-brackish or saline marshes, borders of woods and clearings.

Eastern N.A. Range: Native. Var. obtusifolius endemic to the east coast of N.B. Var. subulatus, Southern; found from Florida to southwestern Maine (Berwick).

* Atriplex laciniata L.; syn. A. sabulosa Rouy



* Atriplex laciniata L.; syn. A. sabulosa Rouy

Maritime Provinces: In N.S., "very locally" along the Northumberland Strait. On P.E.I., with one locality each on the North Shore, and on Northumberland Strait at Wood Island, Kings Co. In N.B., "scattered along Northumberland Strait". Scoggan (1978) reports it also from two localities in Gloucester Co., one in Northumberland Co., in Northeastern N.B. (Miscou, Youghal and Fox Island) and from the Magdalen Islands.

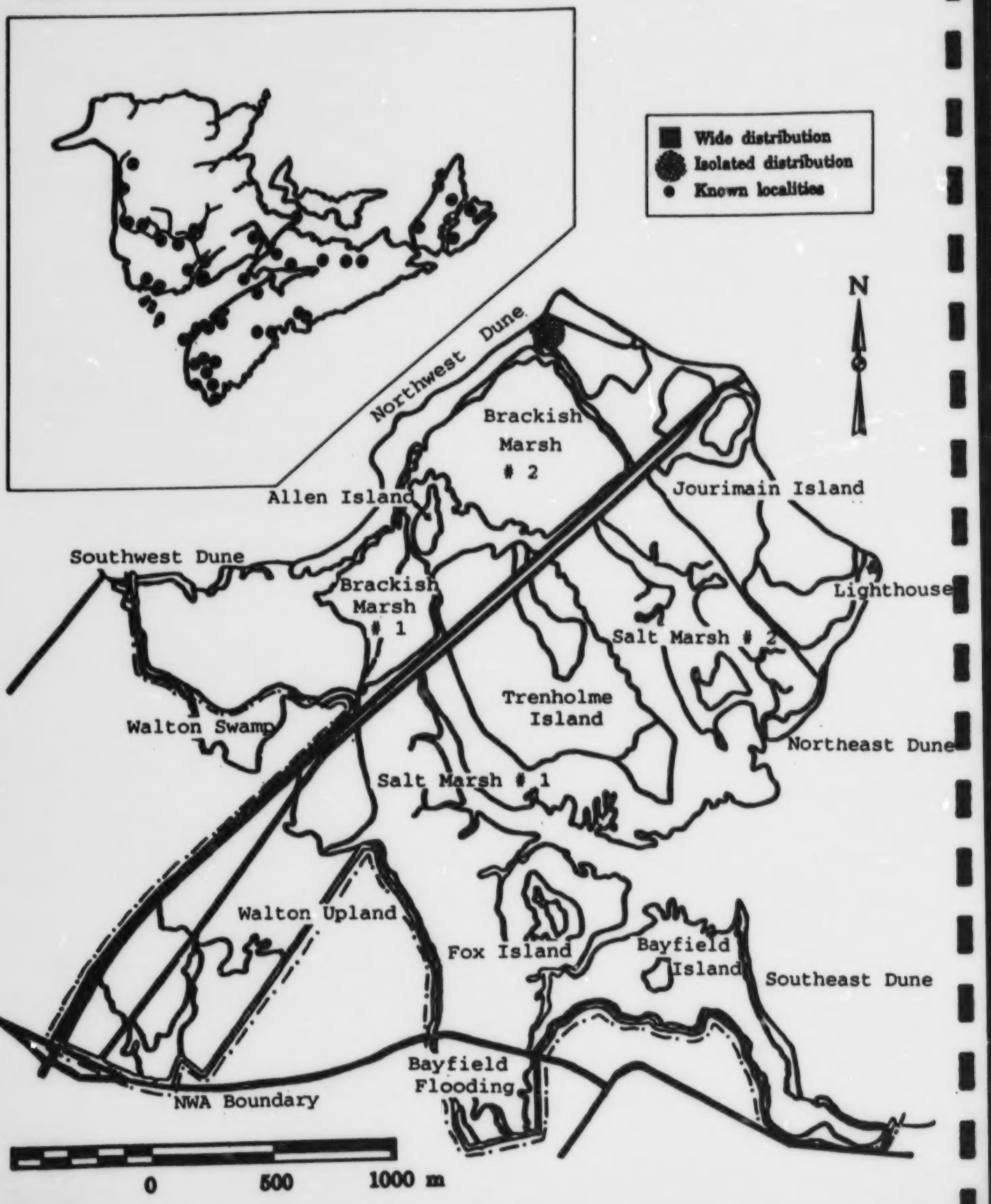
CJNWA: Occasional isolated plants discovered on the upper beach. Observed in 1988 on the Northwest Dune (880818-01) and the Northeast Dune. Collected in 1975 on Southwest Dune (75010). As with other annuals, occurrence of the species fluctuates from year to year. No plants were observed in 1989 or 1990.

Other records from Tormentine Peninsula: None.

Maritime Habitat: Upper parts of protected sand or sand and cobble beaches.

Eastern N.A. Range: Introduced from western Europe. A coastal plant, known from both sides of the North Atlantic; relatively rare throughout its range. In N.A., confined to southwestern Gulf of St. Lawrence area.

• Botrychium dissectum Spreng.



* Botrychium dissectum Spreng.

Maritime Provinces: In N.S., scattered throughout , most common in the southwest. Not reported from P.E.I. In N.B., according to map, from St. John River valley westward, with additional isolated occurrence in the Hillsborough area, Albert Co.

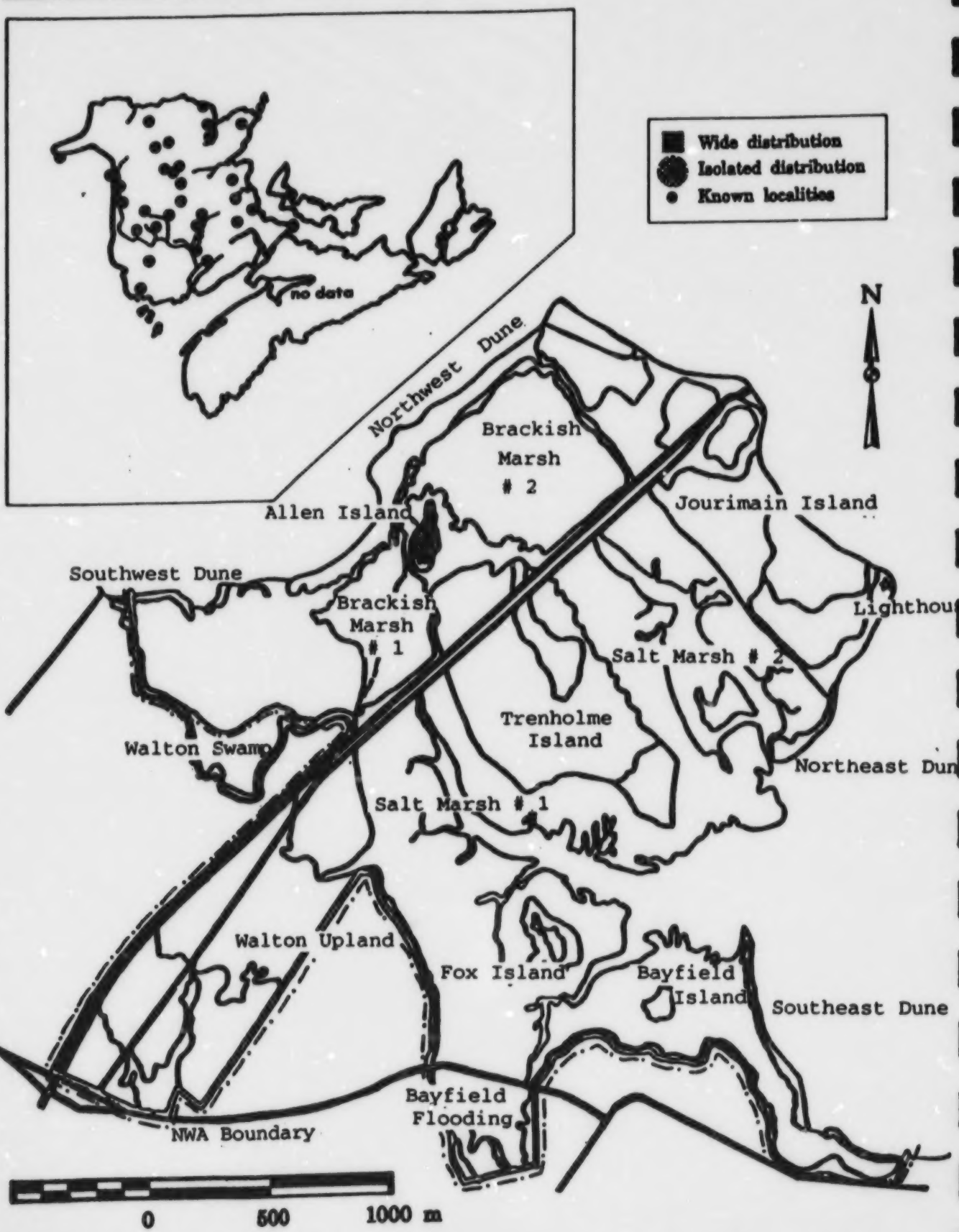
CJNWA: A single plant found with Athyrium thelypteroides, in the relict hardwood forest, with white ash and red oak, at the western end of Jourimain Island (890819-08).

Other records from Tormentine Peninsula: None.

Maritime Habitat: In N.S., "in sandy or gravelly, either open or turfy soils". In N.B., "pastures, swampy woods and rich hardwoods".

Eastern N.A. Range: Native. Southern. Found from North Carolina to Cape Breton, southern N.B., and Quebec City area.

* Brachyelytrum erectum (Schreb.) Beauv.



* Brachyelytrum erectum (Schreb.) Beauv.

Maritime Provinces: In N.S., "scattered but never abundant". On P.E.I., only one locality in Prince Co. In N.B., "common throughout".

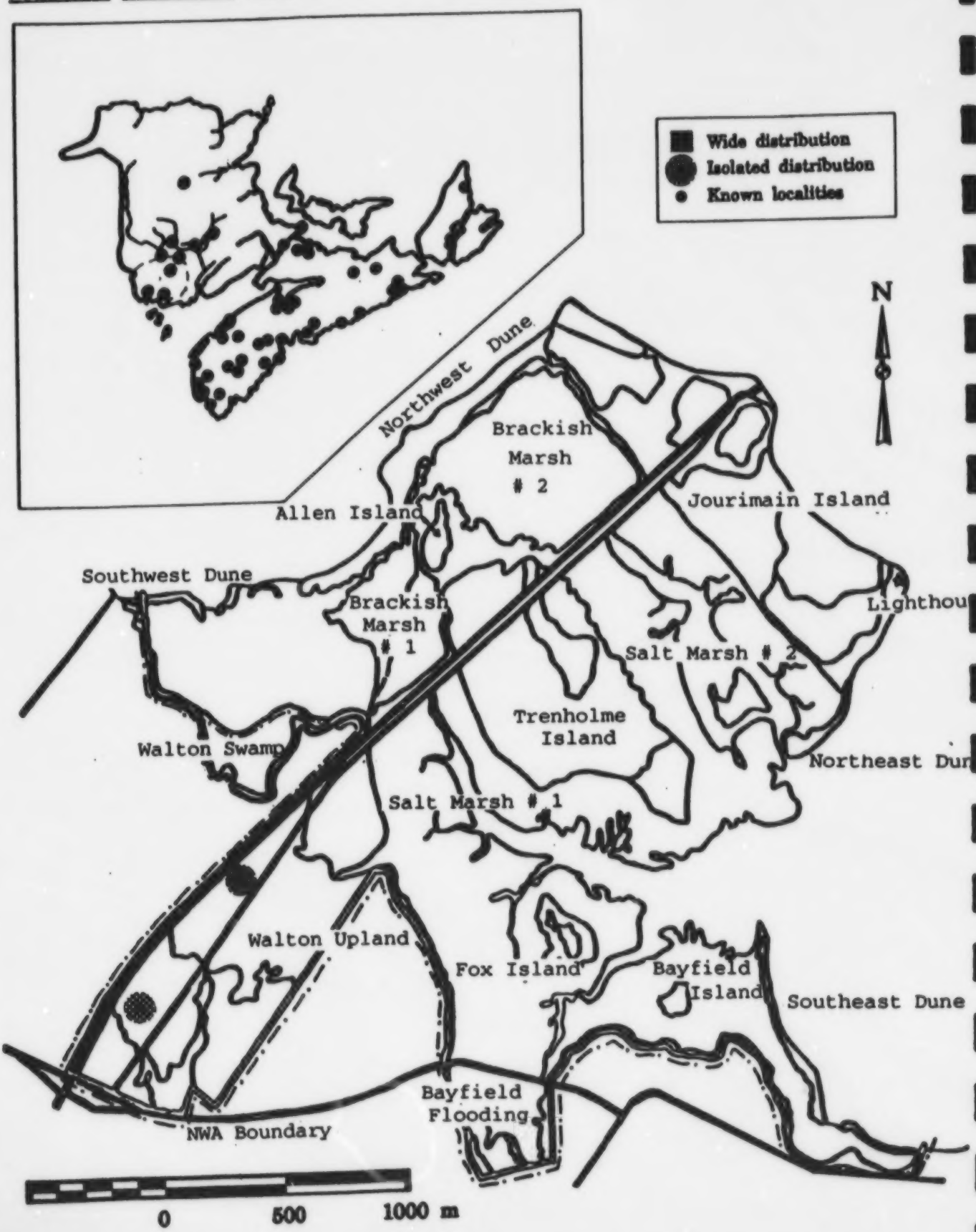
CJNWA: Collected on Allen Island in relict hardwood forest near the edge (880615-02).

Other records from Tormentine Peninsula: None.

Maritime Habitat: In rich, moist mixed woods or hardwoods, and in wet rocky areas along shaded streams.

Eastern N.A. Range: Native. Southern. Found from Georgia to Newf., Anticosti Island, and Saguenay, P.Q.

** Brasenia schreberi Gmel



** Brasenia schreberi Gmel.

Maritime Provinces: In N.S., "local but widely distributed in the western and southern counties, rare northeastward". Not reported from P.E.I.. In N.B., "uncommonly scattered", mostly in the southwestern part; one isolated occurrence in the upper Miramichi area. Recorded also for several lakes at the head of the Chignecto Coastal Marshes on both sides of the N.B./N.S. border (H. Harries, unpublished info.).

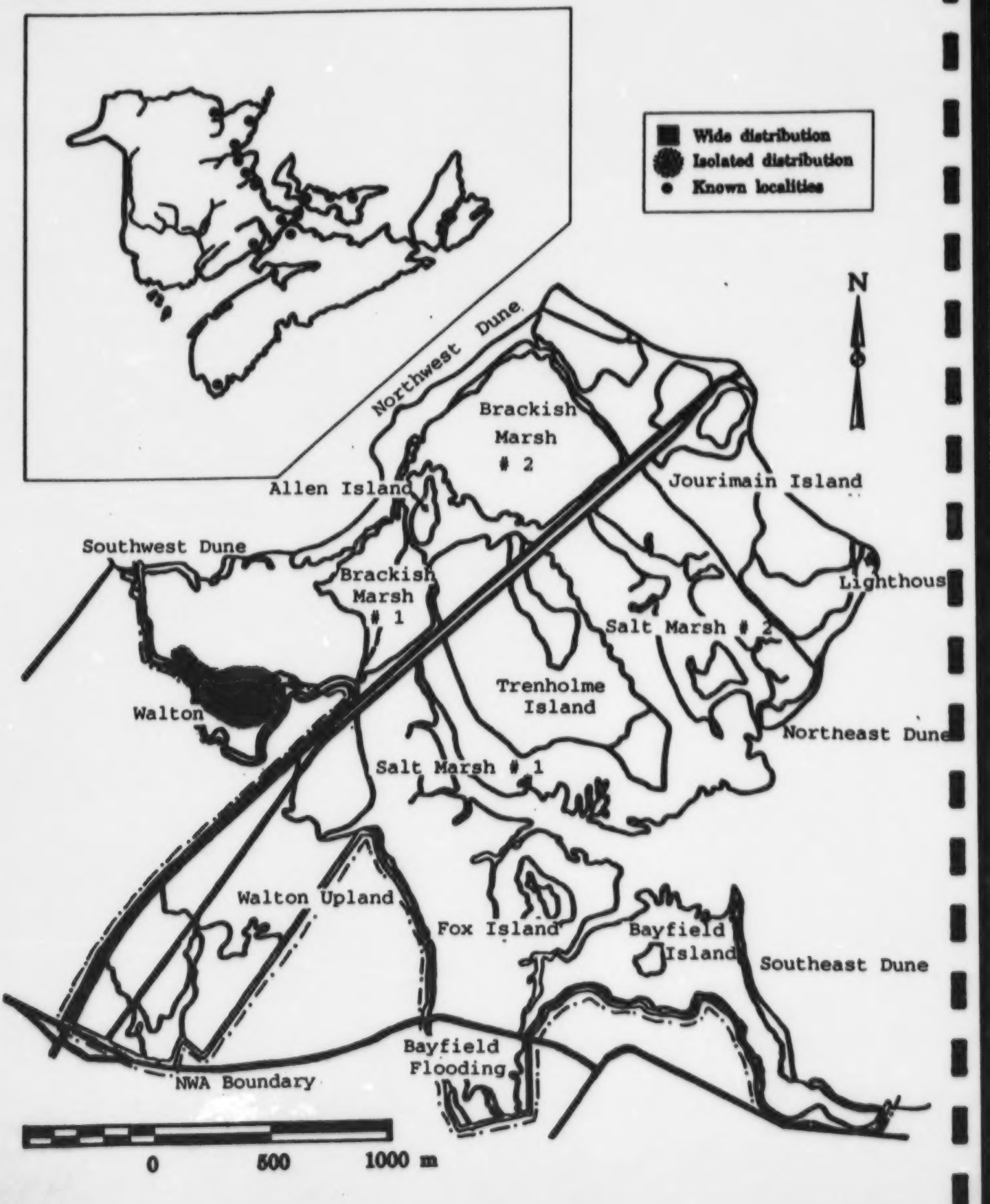
CJNWA: Found on mainland portion, in flooded area of former red maple swamp forest between the causeways (890516-06).

Other records from Tormentine Peninsula: None.

Maritime Habitat: Ponds, lakes and backwaters.

Eastern N.A. Range: Native. Southern. Found from Florida to Cape Breton Island, south shore of Gaspé peninsula, and Saguenay, P.Q.

* Calamagrostis neglecta (Ehrh.) Gaertn.



* Calamagrostis neglecta (Ehrh.) Gaertn.; syn. C. stricta (Timm.) Koel.

Maritime Provinces: For N.S. rare, only three localities; on Cape Breton Island, at Beaver Lake, Yarmouth Co. and in the marshes at the head of the Cumberland Basin. On P.E.I., three localities, all coastal, with only one on the Northumberland Strait at Summerside. In N.B., largely restricted to the East Coast from the Kouchibouquac area to Miscou, Gloucester Co., with three additional localities elsewhere in the eastern part of the province.

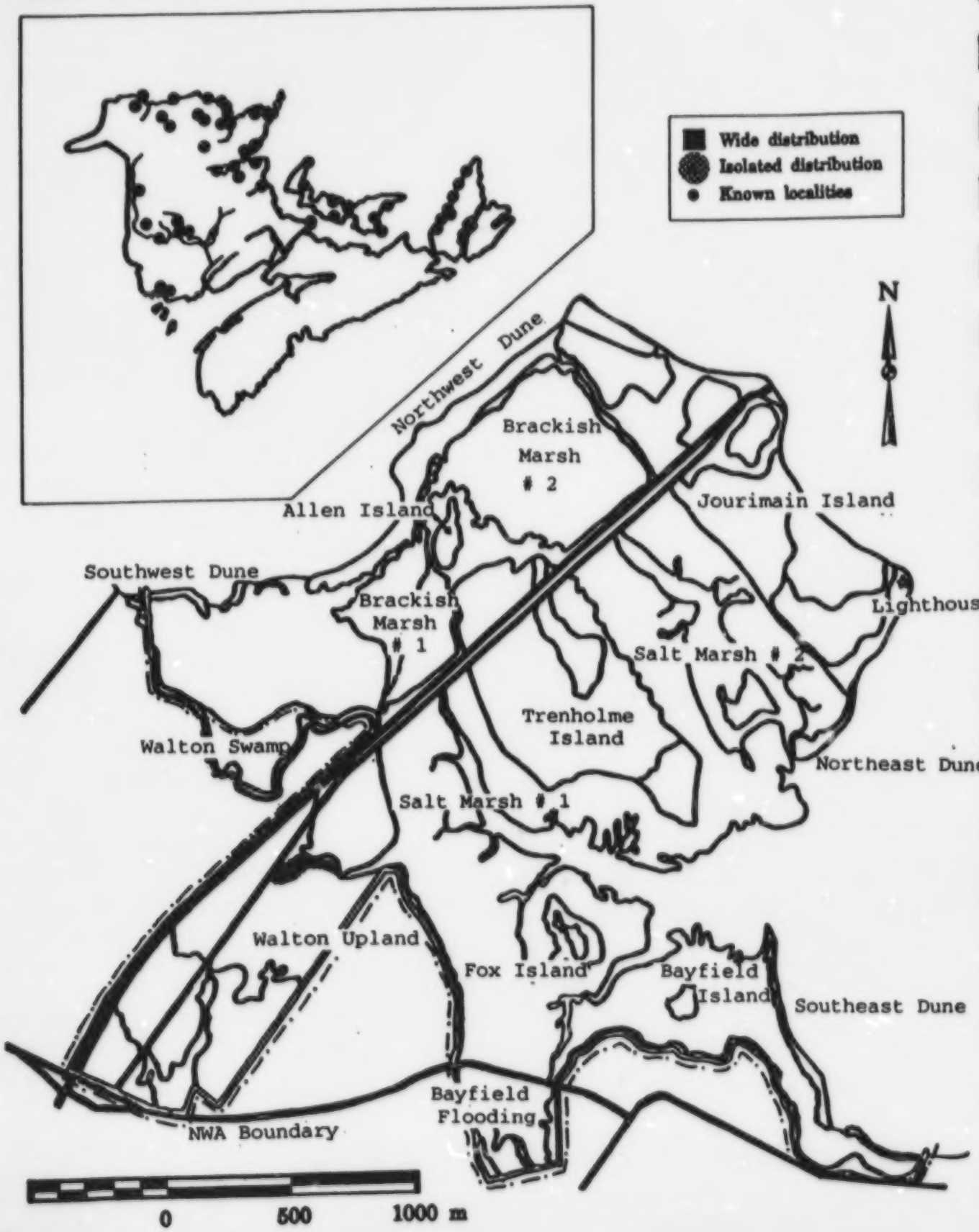
CJNWA: One colony in Walton Swamp, as minor occasional component in Scirpus lacustris -Thelypteris palustris -Myrica gale community, extending seaward into edge of salt marsh (880817-06).

Other records from Tormentine Peninsula: Two localities at Cape St. Laurent (890701-07).

Maritime Habitat: Wet meadows and landward edge of salt marshes; on P.E.I. reported from edges of fresh-brackish marshes.

Eastern N.A. Range: Native. Northern. Found from northern Vermont, N.H., and Maine, and southern N.S. to Devon Island

** Caltha palustris L.



** Caltha palustris L.

Maritime Provinces: In N.S., "sharply restricted range"; being found only on west coast of Cape Breton Island. On P.E.I., "common throughout". In N.B., "scattered and uncommon in the southwest and common in the northeastern third of the province".

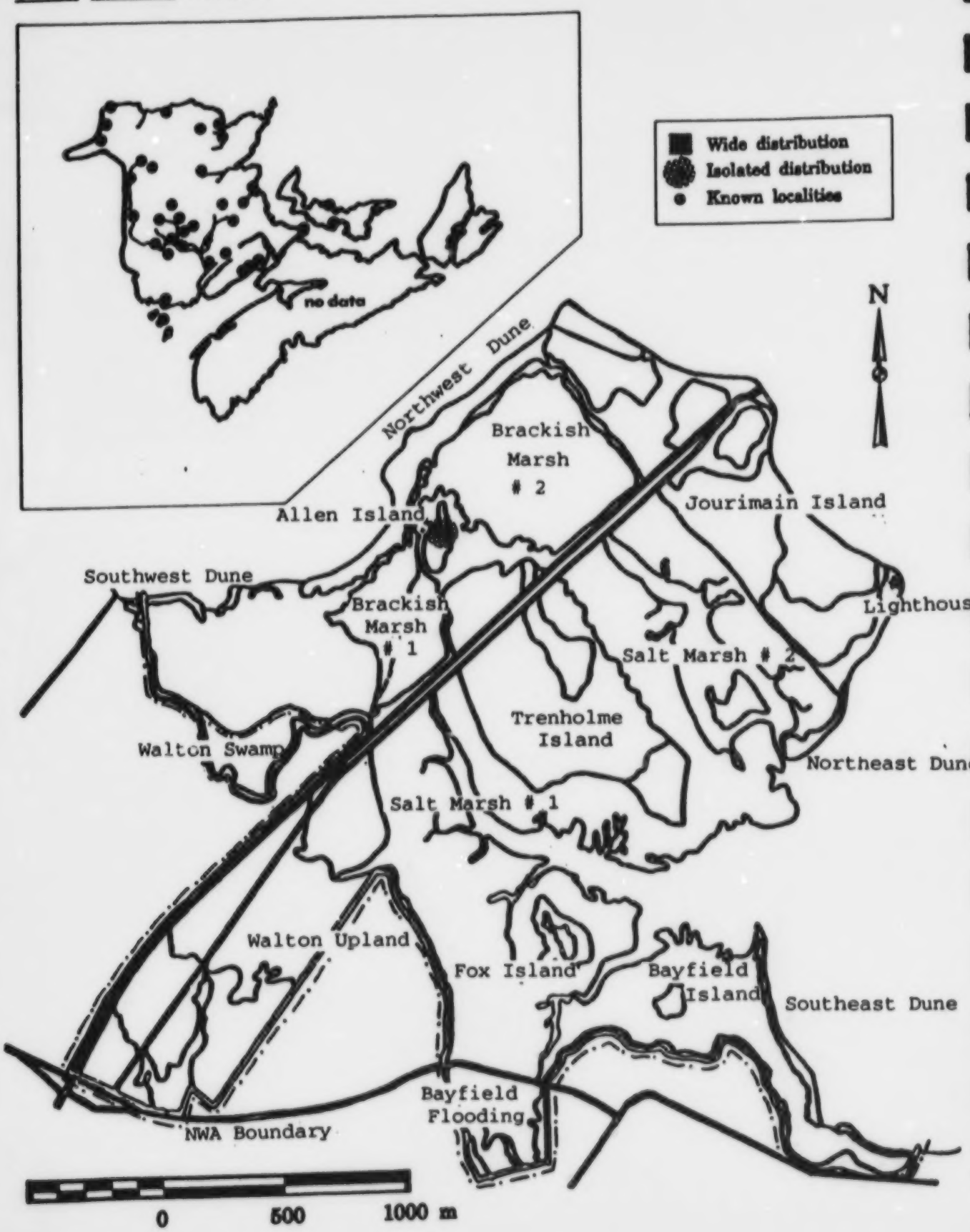
CJNWA: Found only in the Walton Upland Swamp, confined to the banks of a stream through an alder swamp (890516-02).

Other records from Tormentine Peninsula: Found just outside of CJNWA in the lower Trenholm Swamp, in a red maple swamp forest.

Maritime Habitat: Shallow water, swampy ground, swale backs, wet stream banks, and wet meadows.

Eastern N.A. Range: Native. Found from South Carolina to Newf. and Côte-Nord.

* Carex deflexa Hornem.



* Carex deflexa Hornem.

Maritime Provinces: In N.S., "not considered rare, only scattered collections...not collected from Cumberland Co. to Antigonish". On P.E.I., "rare", with only three localities in the eastern half. In N.B., "common throughout".

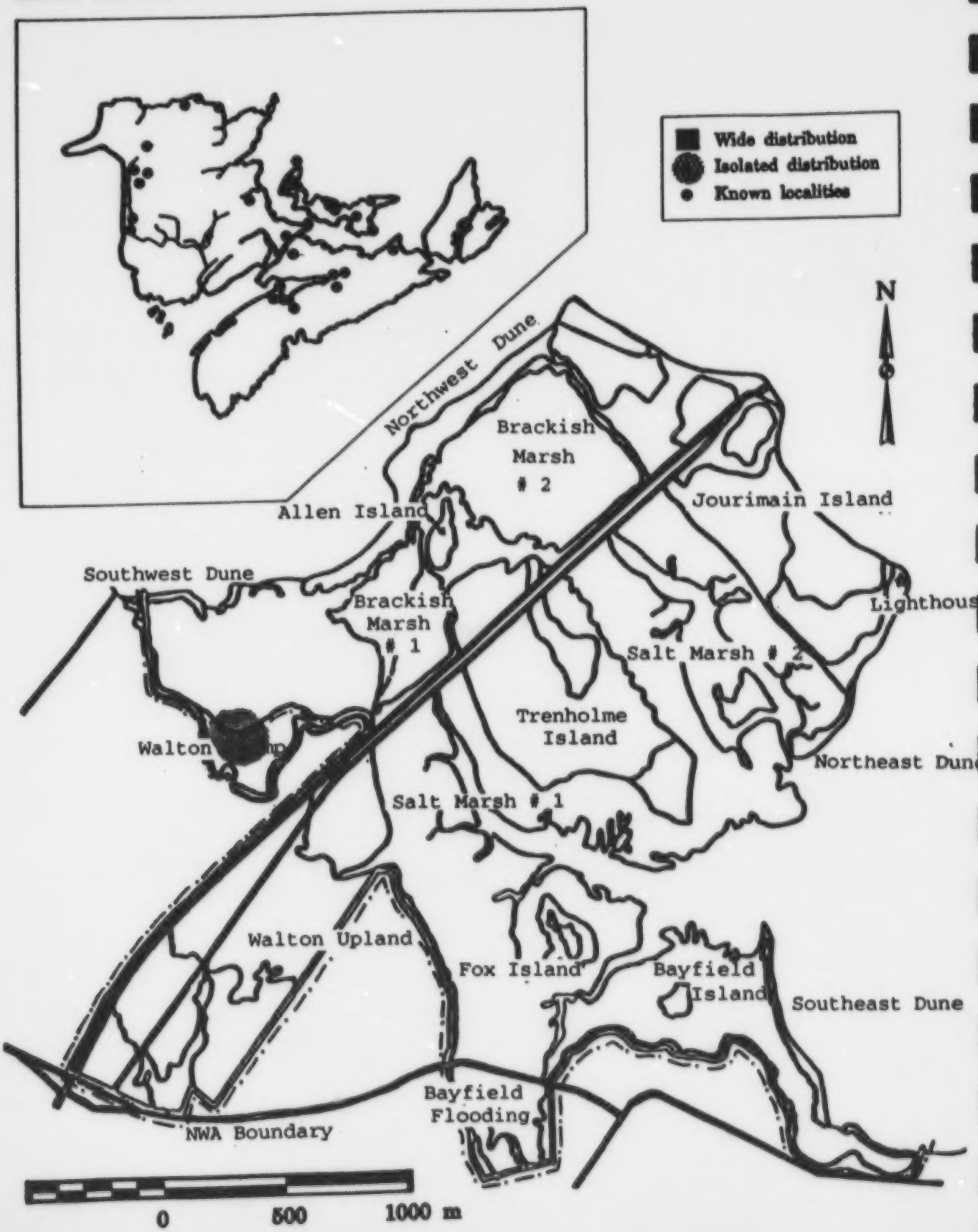
CJNWA: In coastal forest edge of Allen Island's relict hardwood forest (880615-05).

Other records from Tormentine Peninsula: None.

Maritime Habitat: In dry, sandy mixed or coniferous woods or in rock crevices (Cape Breton).

Eastern N.A. Range: Native. Northern. Found from northwestern Mass. to Labrador (Okkak, 57 40' N.).

• *Carex diandra* Schrank



* Carex diandra Schrank

Maritime Provinces: In N.S., restricted to Cape Breton and to the marshlands along the Minas Basin and Cumberland Basin, except for one locality near Antigonish. On P.E.I., scattered localities, but only one along Northumberland Strait at Charlottetown. In N.B., reported to be uncommon, occurring mostly in the north, with only three localities along the East Coast.

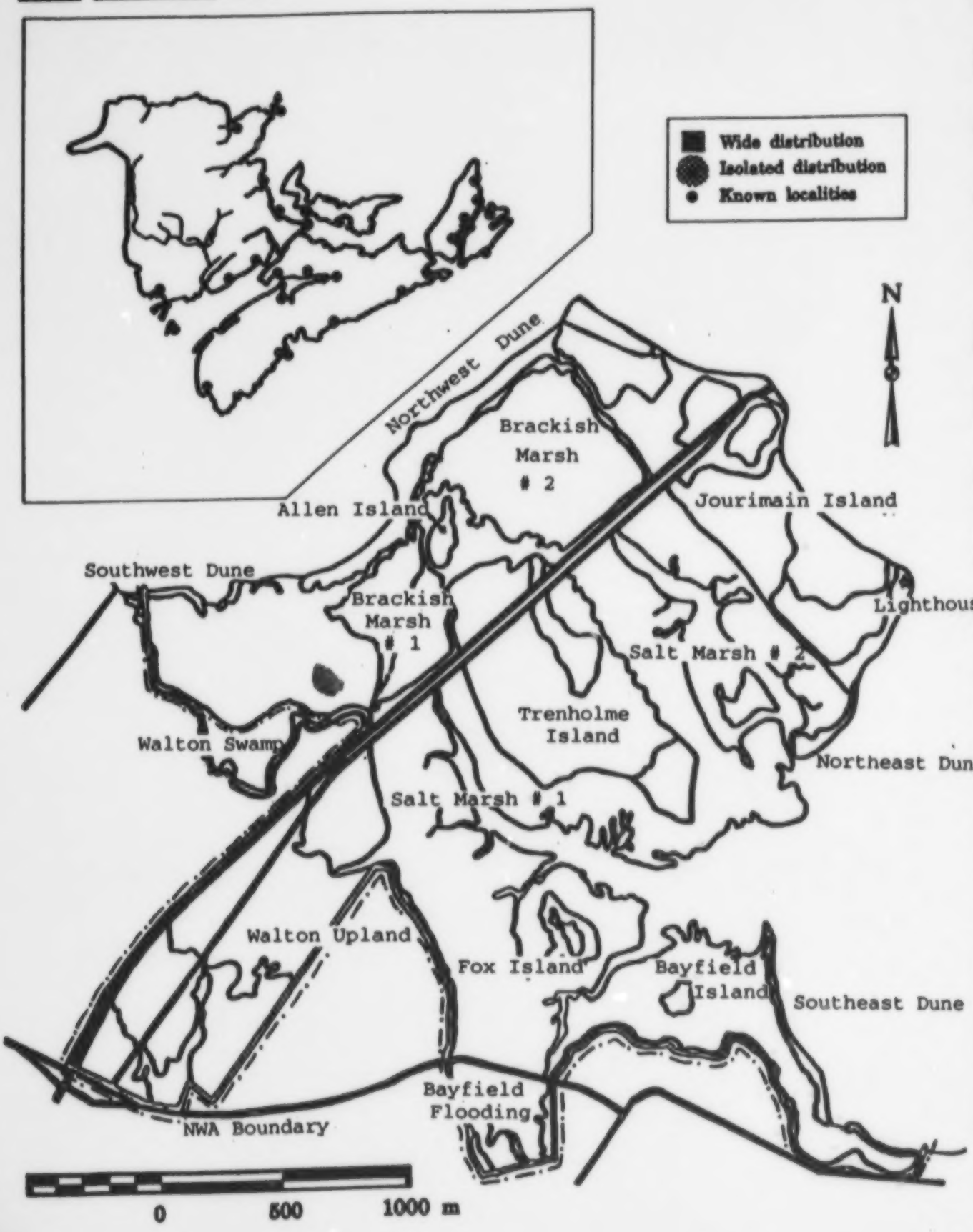
CJNWA: An extensive population in Walton Swamp; here widely distributed and locally prominent in Scirpus lacustris - Thelypteris palustris - Myrica gale community; (880817-02).

Other records from Tormentine Peninsula: None.

Maritime Habitat: Boggy lowlands, especially in calcareous and alkaline soils, cat-tail swales, and wet meadows.

Eastern N.A. Range: Native. Found from northern N.J., and northern Conn., to southern Labrador (Forteau, 51 28′ N.).

* Carex mackenziei Krecz



* Carex mackenziei Krecz

Maritime Provinces: In N.S., "scattered around the coast", but without any localities for the Gulf of St. Lawrence shore or the North Shore. Found at Five Islands, Colchester Co., and Advocate, Cumberland Co. On P.E.I., only two localities, both along the Northumberland Strait; at Summerside and Rocky Point, Queen's Co. In N.B., "scattered along the coastal areas", including four localities along the East Coast.

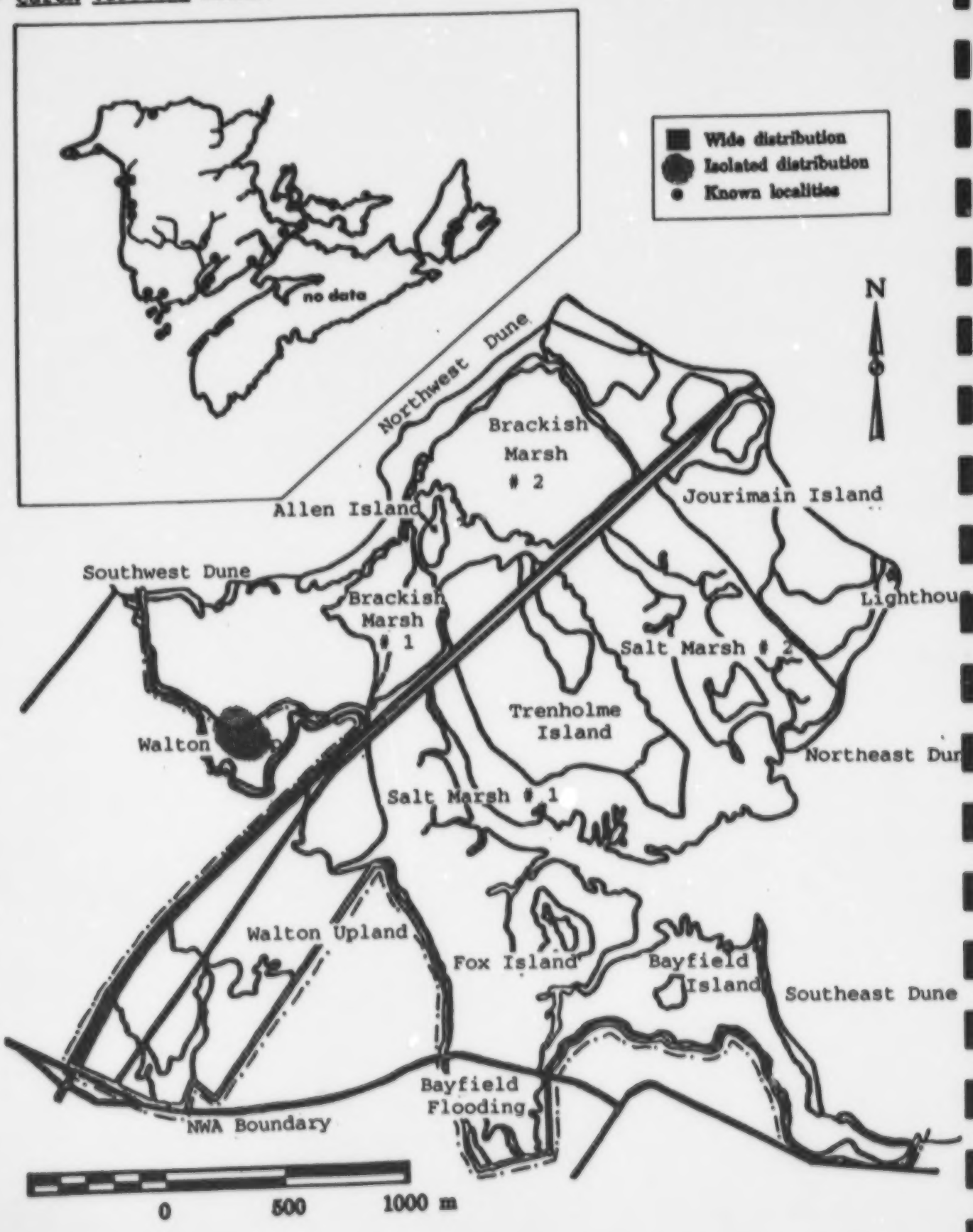
CJNWA: One population in the eastern part of the Southwest Marsh, affected by impounding (880817-21); also collected (73005). Here locally dominant in a wet depression within a brackish marsh community, with dominant Festuca rubra, Spartina pectinata, and Carex paleaceae.

Other records from Tormentine Peninsula: Found at Cape St. Laurent, East Marsh (890701-06).

Maritime Habitat: Saline or brackish marshes and shores, sometimes forming a band at the head of marsh or salt ponds.

Eastern N.A. Range: Found from southwestern Maine (Wells) to Newf. and Côte-Nord.

• Carex viridula Michx.



* Carex viridula Michx.

Maritime Provinces: In N.S., throughout "scattered to rather common". On P.E.I., "local", with six localities, mostly in dune slacks, from Prince Co. eastward along north shore; one inland occurrence in a hardwater-region. In N.B., mainly in the western and southern parts, with no localities along the East Coast.

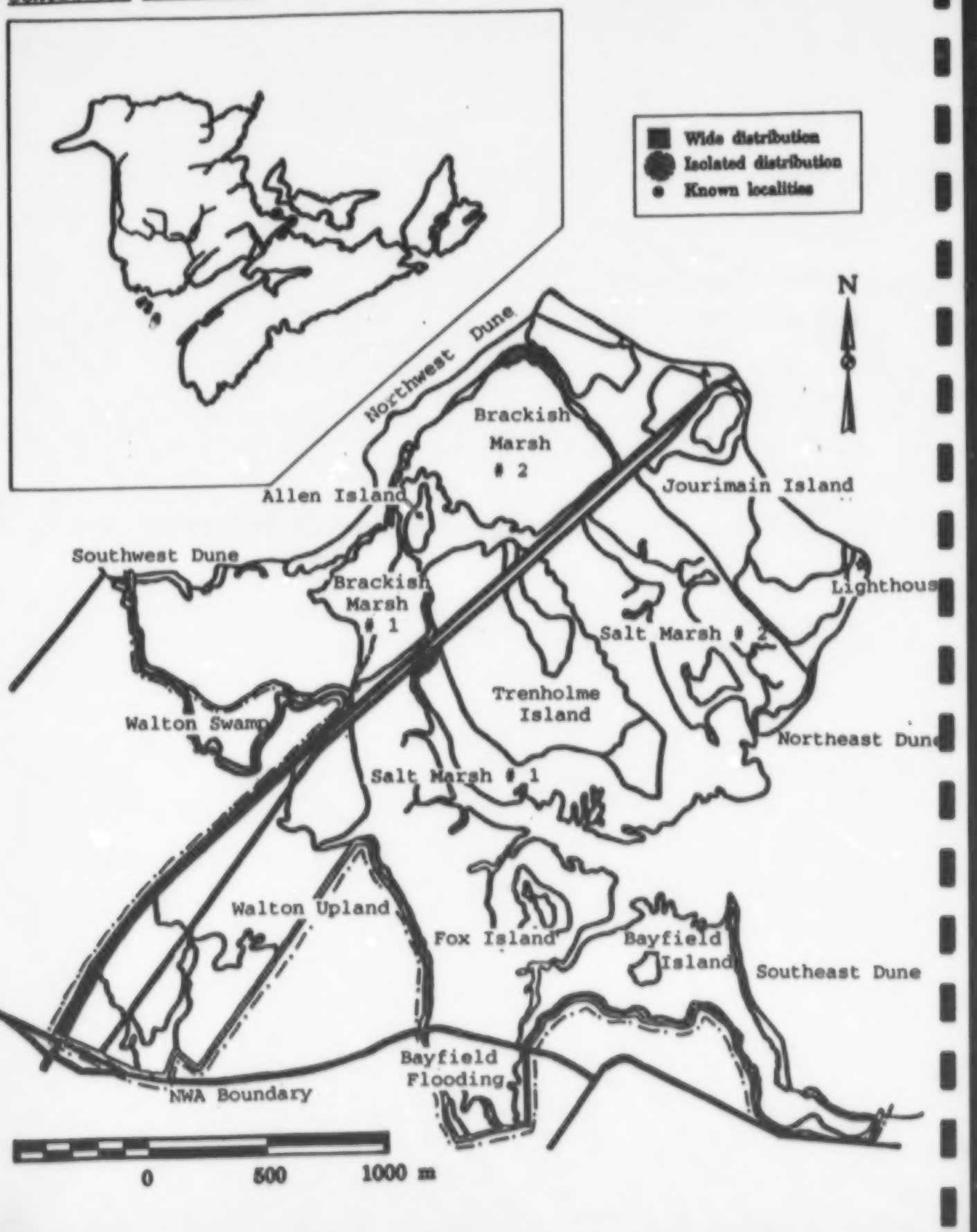
CJNWA: One population in Walton Swamp, as a minor component in openings with low vegetation, within the Scirpus lacustris -Thelypteris palustris -Myrica gale community (880817-07).

Other records from Tormentine Peninsula: In brackish marsh between tidal salt marsh and bog west of Cape St. Laurent (860928-02, 890701-05).

Maritime Habitat: Gravelly and rocky shores (calcareous), coastal pastures, sphagnous swales, and borders of brackish ponds or inlets.

Eastern N.A. Range: Native. Found from northern N.J. and southern New England, to Newf., Côte-Nord, and Ungava (Knob Lake, 54 48' N.).

• Centaurium pulchellum (Sw.) Druce



* Centaurium pulchellum (Sw.) Druce

Maritime Provinces: In N.B., known only from the Tormentine Peninsula, near Cape Bruin, Westmorland Co. and near Cape Tormentine (Scoggan, 1979). The plant reported as C. umbellatum Gilib. from Tidnish, N.S. may be suspected of being likewise C. pulchellum and part of the same isolated population. No records for P.E.I.

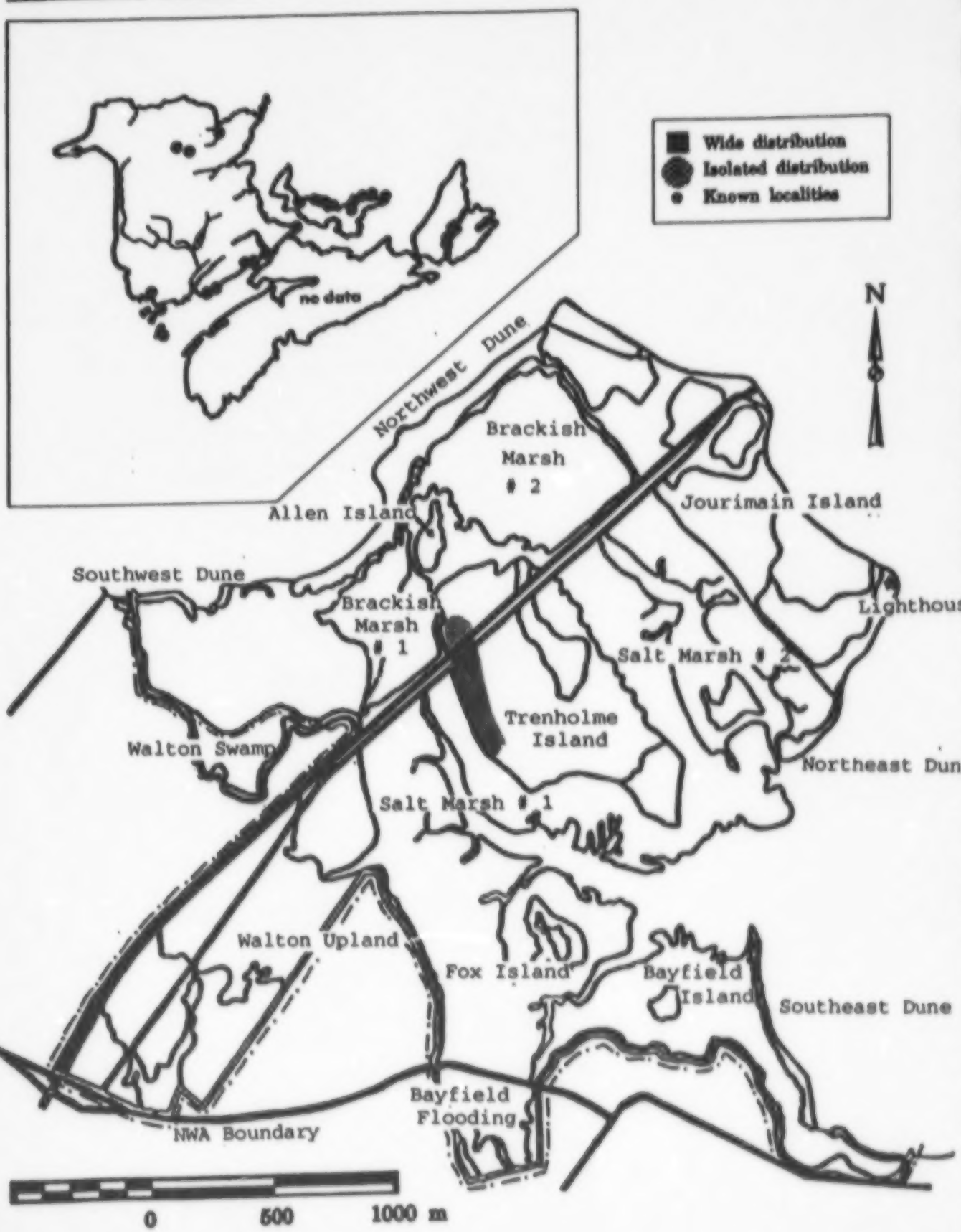
CJNWA: In scattered, isolated colonies in landward fringe of salt marsh, upland oldfields, and on causeway. Always found in vehicle tracks, and generally associated with Agrostis stolonifera and Juncus bufonius (830814-01, 880818-10).

Other records from Tormentine Peninsula: None.

Maritime Habitat: As above.

Eastern N.A. Range: Introduced from western Eurasia. In New England and Atlantic Canada, known only from the Tormentine Peninsula and Baie Verte area of N.B. and N.S.

• Deschampsia flexuosa (L.) Trin.



* Deschampsia flexuosa (L.) Trin.

Maritime Provinces: In N.S., "common throughout". On P.E.I., found "near the North Shore" and near Charlottetown. In N.B., confined to the Bay of Fundy coast and the northern part of the province.

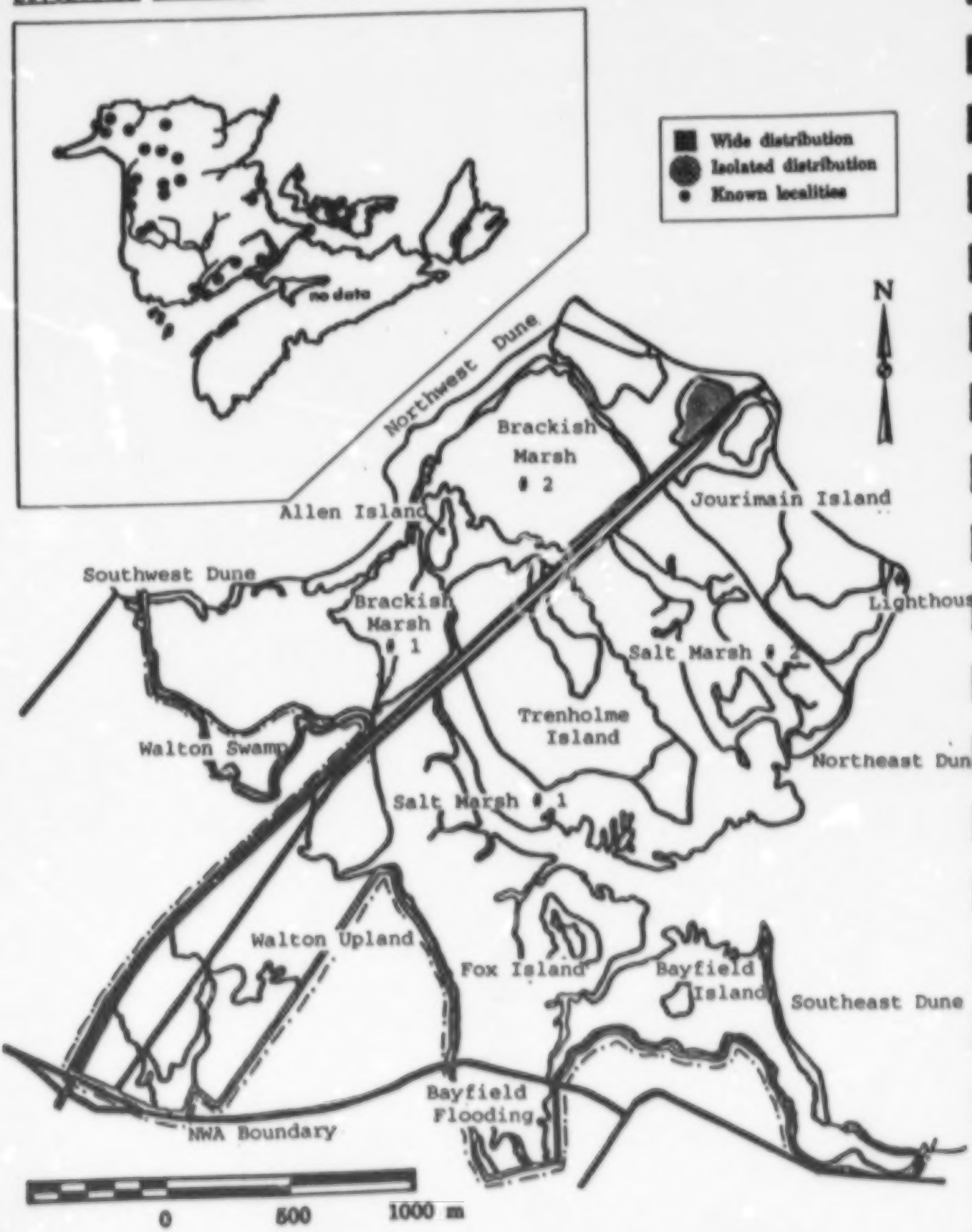
CJNWA: One population on Trenholm Island, on the slope near the south shore. Found in second-growth mixed forest with heath shrubs, Pteridium aquilinum, Aralia nudicaulus, and Solidago puberula (890706).

Other records from Tormentine Peninsula: None.

Maritime Habitat: Exposed sites; rocky shores, sandy, in sandy spruce woods and exposed headlands.

Eastern N.A. Range: Native. Found from Virginia to northern Labrador (Port Burwell, 60 25' N.).

• Dryopteris austriaca (Jacq.) Woynar var. austriaca



* Dryopteris austriaca (Jacq.) Woynar var. austriaca
Syn.: D. spinulosa (O.F. Muell.) Watt. var. americana (Fisch.) Fern, D. campyloptera (Kunze) Clarkson.

Maritime Provinces: In N.S., "along the Bay of Fundy, scattered in rich woods in the southwestern counties and common along the Cobequids to northern Cape Breton". On P.E.I., "scattered in deciduous woods along North Shore from Cavendish eastward ". In N.B., "frequent along the Bay of Fundy and in the Central Highlands, uncommon elsewhere". Only two occurrences along the East Coast in the Kouchibouguac area.

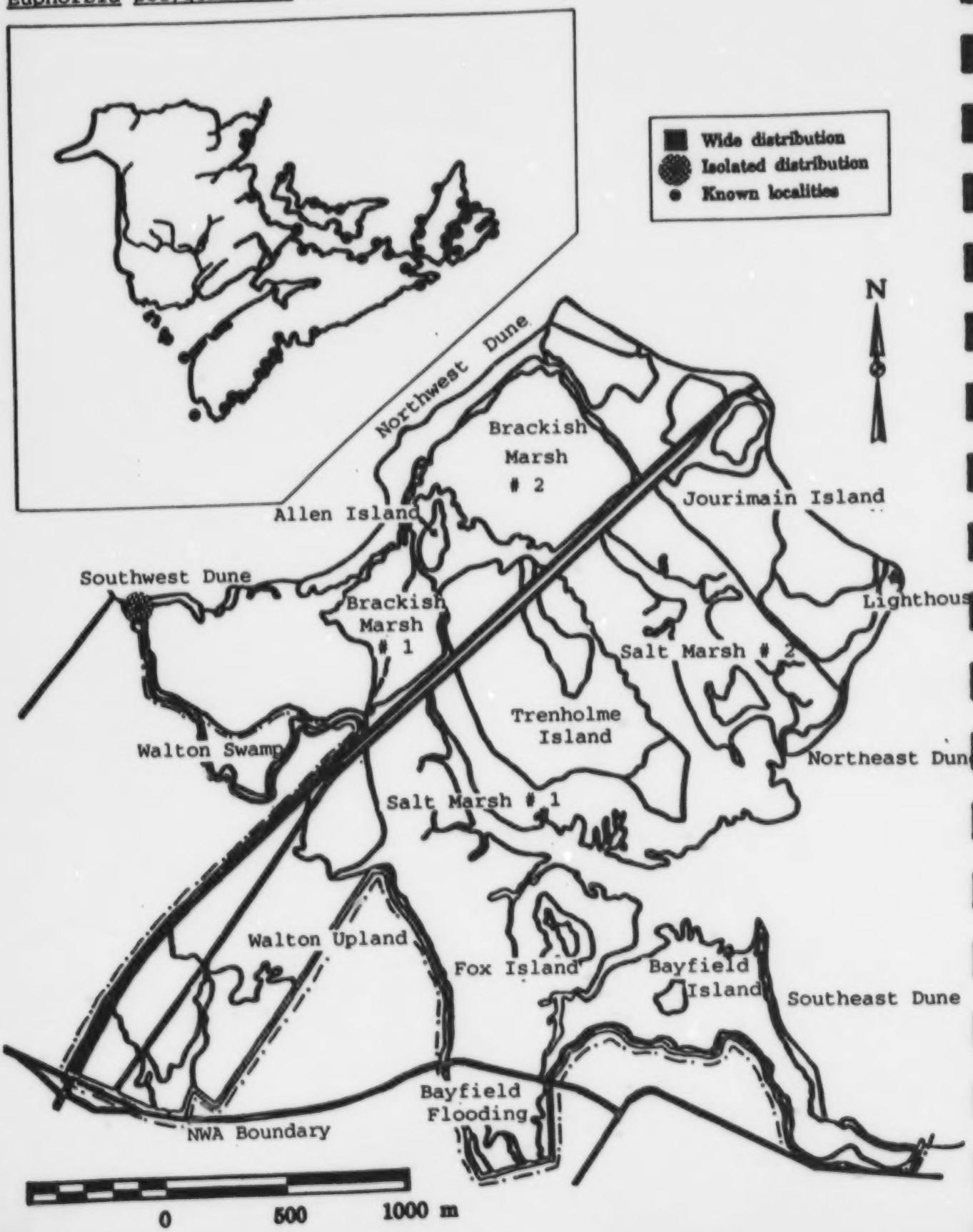
CJNWA: In remnant mixed forest in the centre of Jourimain Island west of the causeway road. (890809)

Other records from Tormentine Peninsula: None.

Maritime Habitat: Cool, moist deciduous or mixed woods, swamps, wet thickets and in rich alluvial soils.

Eastern N.A. Range: Native. Northern. Found from northwestern Mass. to Ungava and Labrador (to ca. 58 N.).

* Euphorbia polygonifolia L.



* Euphorbia polygonifolia L.

Maritime Provinces: In N.S., reported to be most common in the southwest, and on the North Shore westward to Pictou, with an additional isolated occurrence at Port Howe, Cumberland Co. On P.E.I., several collections from North Shore; only one record for Northumberland Strait shore, at Wood Island. In N.B., "rare; reported from a few east coast areas in Gloucester and Kent counties and Grand Manan".

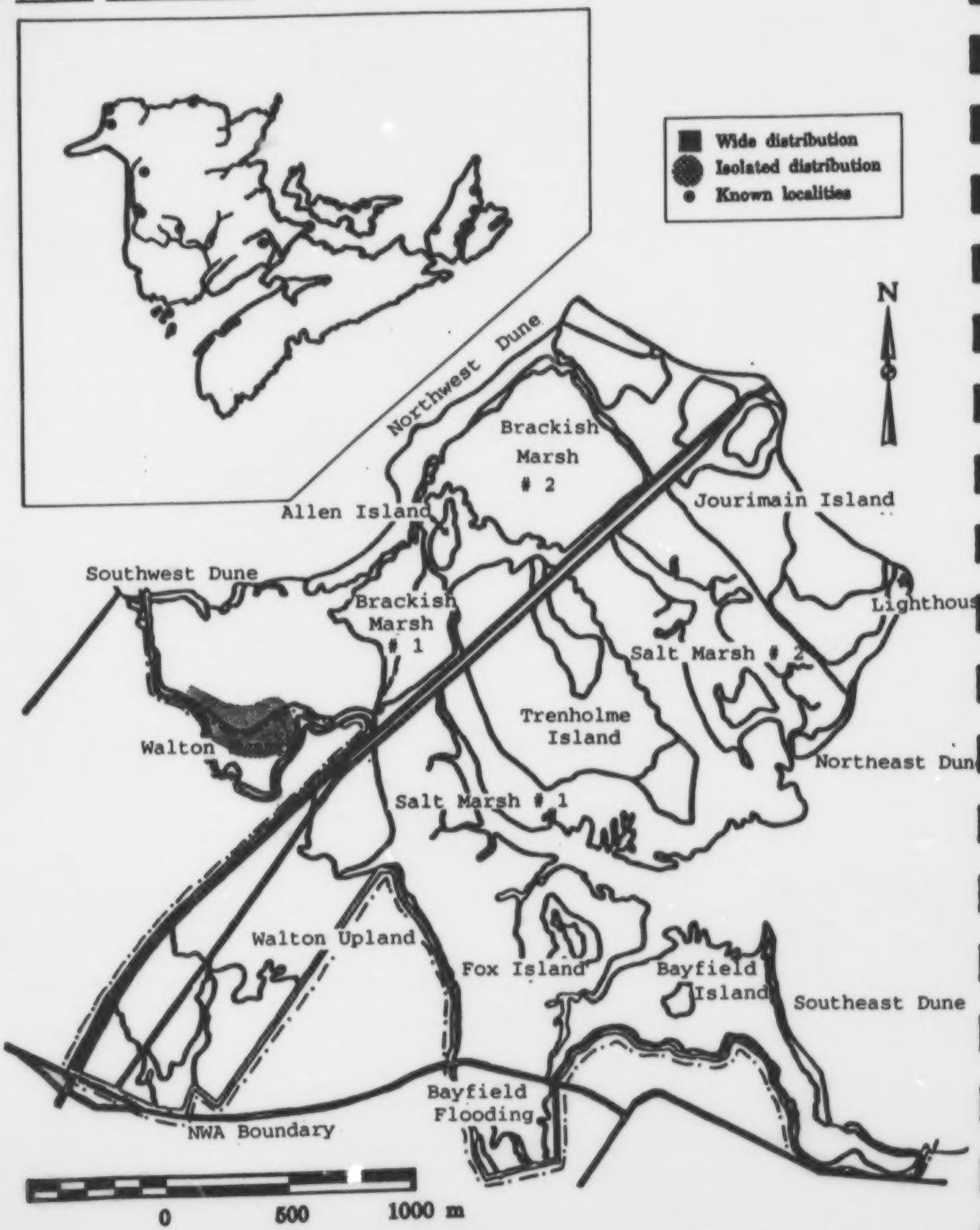
CJNWA: A colony of about 40 plants in bare sand area behind a beach in low Ammophila dune, associated with other annuals, including Atriplex littoralis, Chenopodium sp., Salsola kali, Cakile edentula, Raphanus raphanistrum, and Gnaphalium uliginosum (900815-01). Lacking in this locality in 1988 and 1989, but observed by H. Harries in this vicinity between 1972 and 1974 .

Other records from Tormentine Peninsula: Found at beach between Cape St. Laurent and Trenholm Island; a single plant (890916-10).

Maritime Habitat: Sandy beaches above high tide line, dune hollows and sand flats.

Eastern N.A. Range: Native. Southern. Found from Georgia to Cape Breton Island, Magdalen Islands, and northeastern N.B.

** Galium labradoricum Wieg.



** Galium labradoricum Wieg.

Maritime Provinces: In N.S., only on Cape Breton Island. On P.E.I., only found in two isolated areas along the North Shore; at Nail Pond, Prince Co., and between Mt. Stewart, Queen's Co. and St. Peter's, King's Co.. In N.B., "rare: reported from scattered localities in Gloucester, Restigouche, Madawaska, Carleton, Albert and Charlotte counties"; lacking along the East Coast.

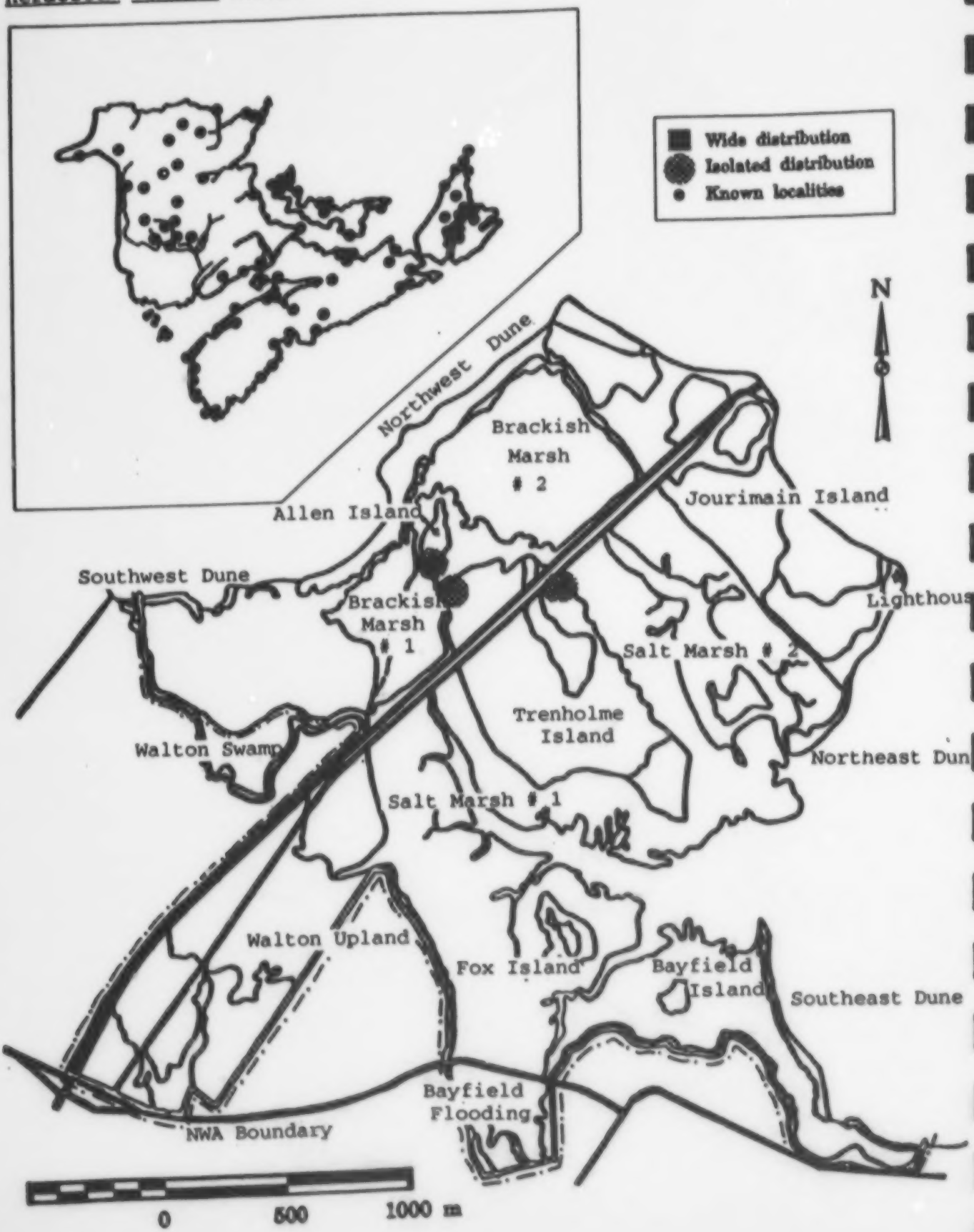
CJNWA: One colony in Walton Swamp, covering an extensive and cohesive area (880817-10, 900615-02). It is especially prominent in the Scirpus lacustris -Thelypteris palustris -Myrica gale community; extending seaward into the upper fringe of the salt marsh with dominant Juncus balticus and Spartina pectinata.

Other records from Tormentine Peninsula: None.

Maritime Habitat: Cool, moist woods, thickets and bogs, and wet meadows. On P.E.I., in dune slacks.

Eastern N.A. Range: Native. Found from northwestern N.J. and northern Conn., to Newfoundland, Hamilton River Basin, and Ungava Bay.

* Heracleum lanatum Michx.



* Heracleum lanatum Michx.

Maritime Provinces: In N.S., "scattered throughout; common in intervales of eastern N.S. and sea bluffs of northern Cape Breton". On P.E.I., "local", with only one occurrence along Northumberland Strait. In N.B., reported to be "common throughout much of the province", but with only two occurrences on the east coast, at tip of Acadian Peninsula and in the Kouchibouguac area.

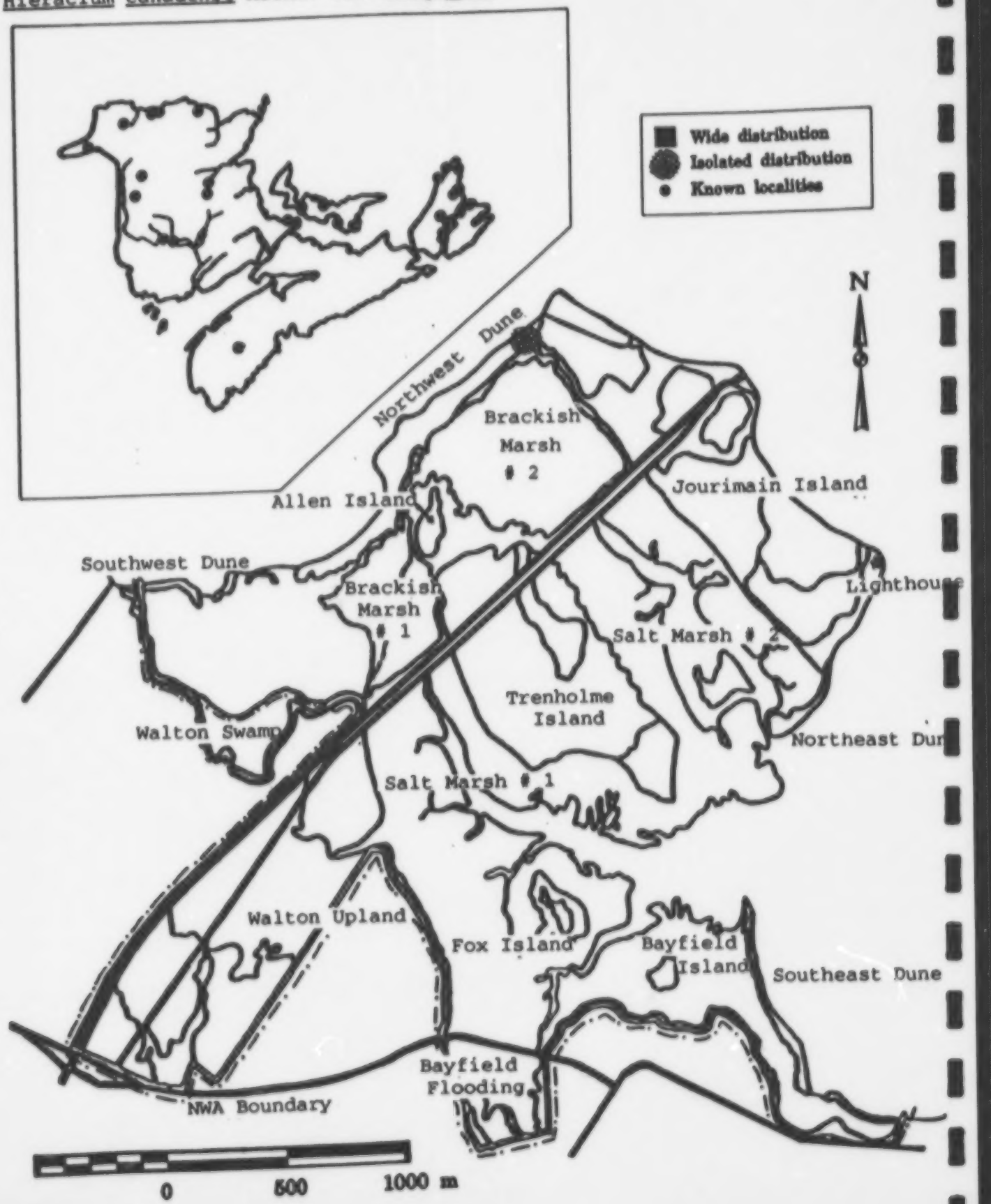
CJNWA: Found within the coastal forest edge, in similar habitat as Angelica lucida and Rhus radicans; with only a few scattered, relatively small plants (890706-02).

Other records from Tormentine Peninsula: None.

Maritime Habitat: Wet meadows, thickets, brook sides in alluvial soil and above shores.

Eastern N.A. Range: Native. Found from Georgia to Labrador (Sandwich Bay, ca. 53 30' N., and Atticamagen Lake, ca. 55 N.).

** Hieracium canadense Michx. var. canadense



** Hieracium canadense Michx. var. canadense

Maritime Provinces: In N.S., "has been found most often in northern Cape Breton", with one locality in Queens Co. On P.E.I., "local", with five occurrences. In N.B., "scattered throughout much of the province", but seems restricted to central and northern parts, except for an isolated occurrence at Cape Jourimain.

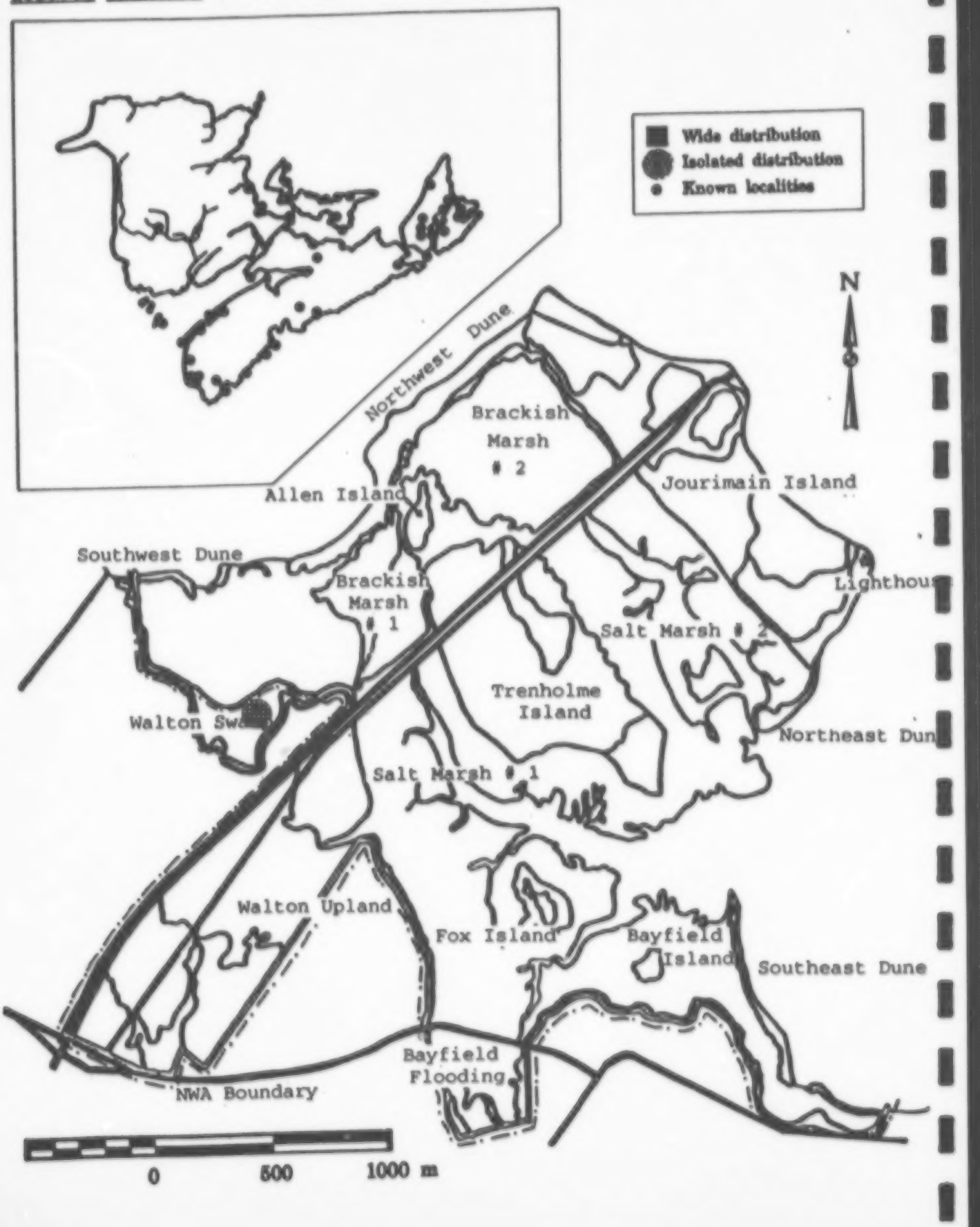
CJNWA: A single patch in the northwestern part of Northwest Dune (890816-06), in decadent Ammophila community, with Solidago sempervirens, Angelica lucida, Arenaria lateriflora, and Myrica pensylvanica.

Other records from Tormentine Peninsula: None.

Maritime Habitat: Disturbed ground, borders of woods, and clearings.

Eastern N.A. Range: Native. Found from northern N.J. and southern New England to Newf. and Côte-Nord.

• Liparis loeselii (L.) Richard



* Liparis loeselii (L.) Richard

Maritime Provinces: In N.S, scattered throughout the province, but with only one locality along the North Shore in Cumberland Co.; apparently mostly coastal. On P.E.I., distributed throughout, but only local. In N.B., rare and restricted to southern part of province, with only four localities, two of them along the East Coast in Kent County.

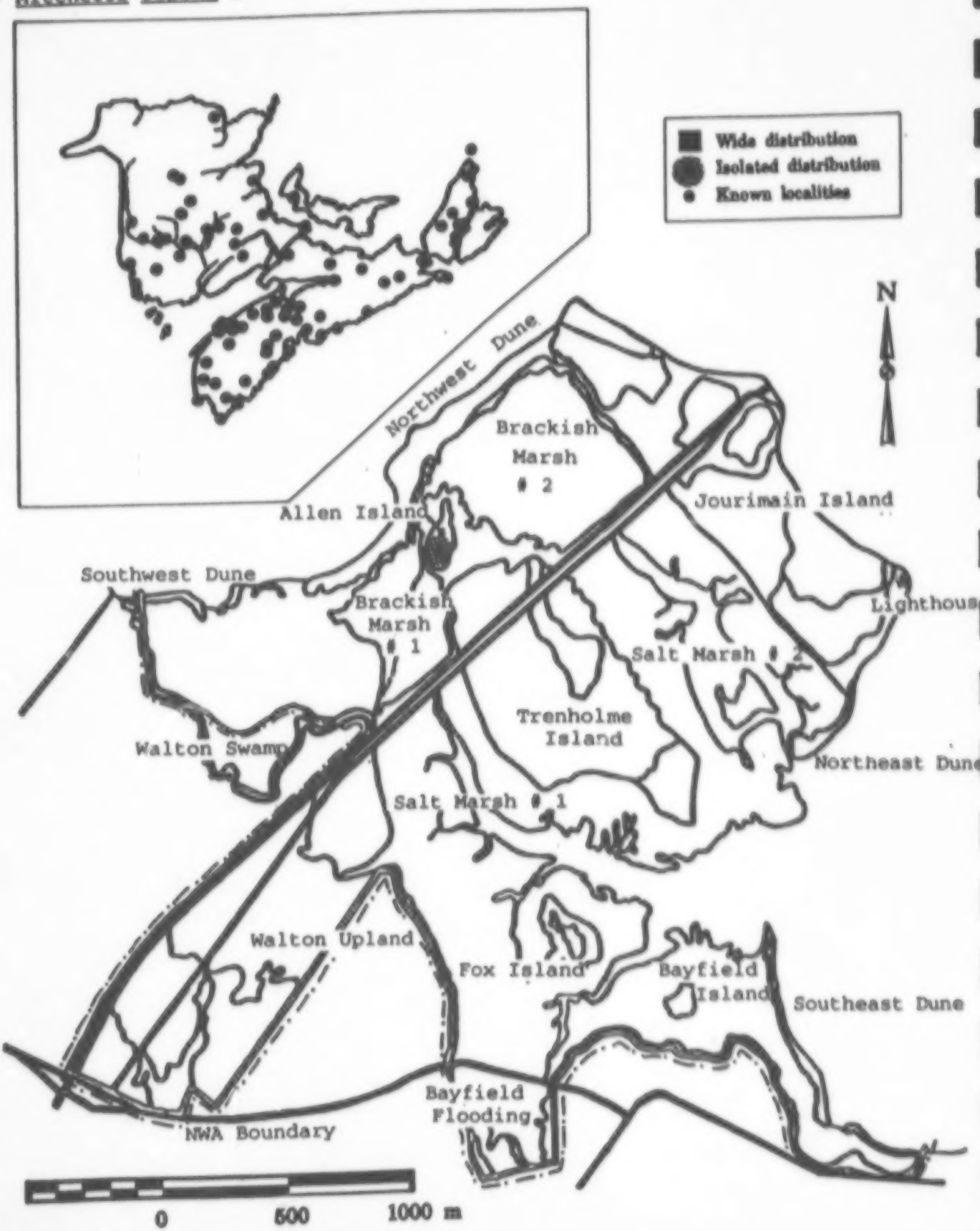
CJNWA: Two separate plants in Walton Swamp, with Carex viridula, in openings within the Scirpus lacustris -Thelypteris palustris -- Myrica gale community; one plant collected (880817 -11).

Other records from Tormentine Peninsula: None.

Maritime Habitat: Damp alder thickets, peaty meadows, bogs, cobbled alluvial shores, and low sandy areas.

Eastern N.A. Range: Native. Southern. Found from Maryland to Cape Breton Island, P.E.I., southern Gaspé Peninsula, and Saguenay.

• Mitchella repens L.



* Mitchella repens L.

Maritime Provinces: In N.S., "common throughout". On P.E.I., only one locality at Portage Island, Prince Co. In N.B., "scattered mostly in southern half...rarer northwards".

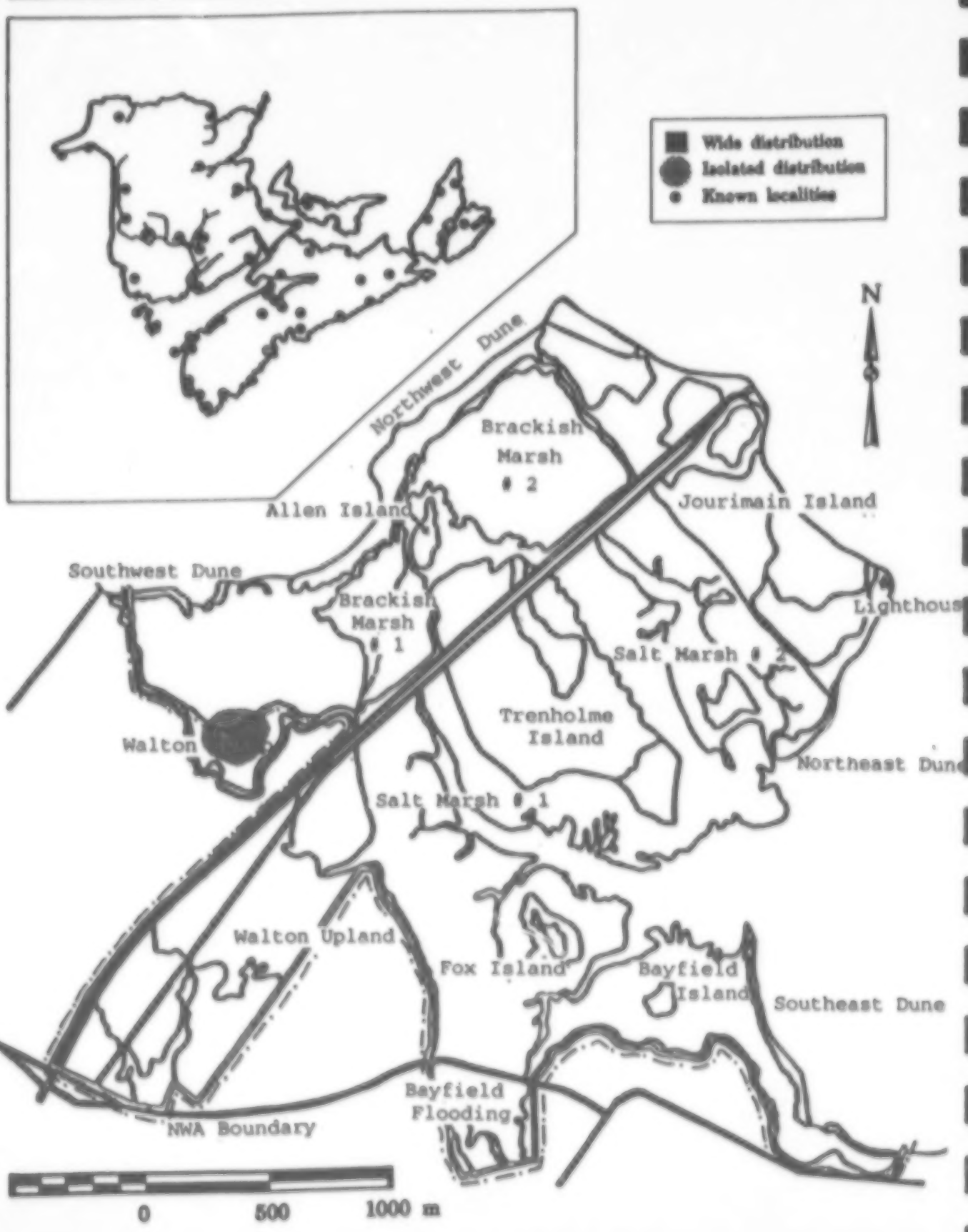
CJNWA: Found in Allen Island's relict hardwood forest, with several small sterile plants (880615).

Other records from Tormentine Peninsula: Found in second-growth forest east of Peacock Cove (890811-03).

Maritime Habitat: Shady and mossy woods, moist banks and hummocky pastures.

Eastern N.A. Range: Native. Southern. Found from Florida to southwestern Newf., P.E.I., and the Gaspé Peninsula.

• Muhlenbergia glomerata (Willd.) Trin.



* Muhlenbergia glomerata (Willd.) Trin.

Maritime Provinces: In N.S., throughout, but most common in the southwest, 'rarer in the east', with only one locality near the North Shore in Cumberland Co.. On P.E.I., only one locality, at Malpeque Bay, Prince Co.. In N.B., scattered throughout, but with only two localities near the East Coast.

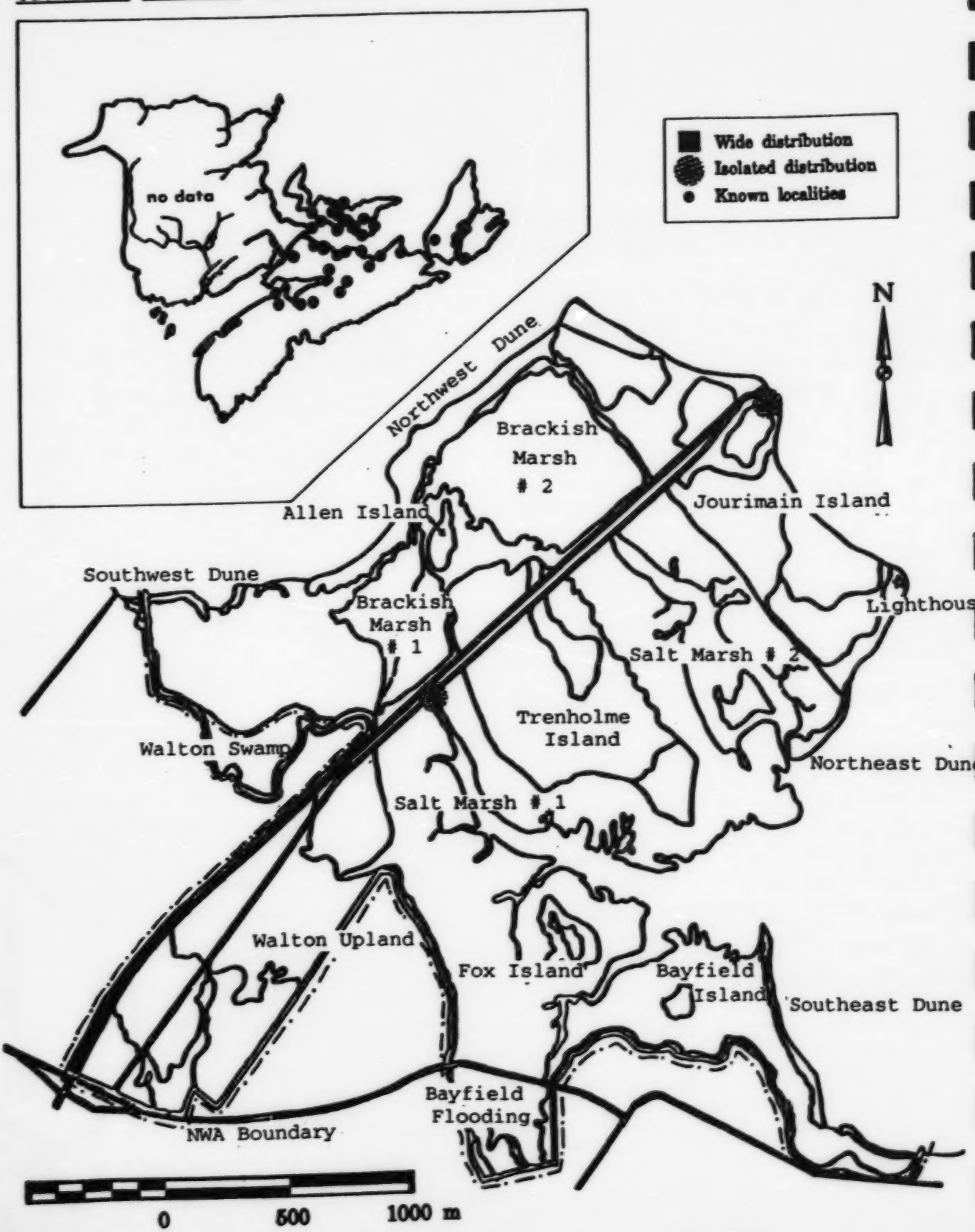
CJNWA: One colony in Walton Swamp, extensive, but only as a minor vegetation component in openings with low vegetation within the Scirpus lacustris -Thelypteris palustris -Myrica gale community; (880817-04).

Other records from Tormentine Peninsula: None.

Maritime Habitat: Cobbled shores, wet meadows, bogs, shores and peaty swales.

Eastern N.A. Range: Native. Found from Virginia to Newf., and Côte-Nord.

* Odontites serotina (Lam.) Dum.



* Odontites serotina (Lam.) Dum.

Identification: Included by Scoggan (1973) and Hinds (1986) as O. verna (Bell.) Dum. It appears preferable to recognize O. serotina as distinct from O. verna. It is distinguished from O. verna by late flowering season, bracts of inflorescence ± shorter than flowers, with several leaves between uppermost branch and base of inflorescence. In Europe, O. serotina is a plant of disturbed, low-patchy meadows, while O. verna is a weed of grain fields (Oberndorfer, 1979). The plants in CJNWA and presumably all Odontites in northeastern N.A. should thus be classified as O. serotina.

Maritime Provinces: In N.S., cohesive range in northern part, absent in south. On P.E.I., confined to central and southwestern parts. In N.B., reported for Cape Tormentine and several localities near the Fundy shore.

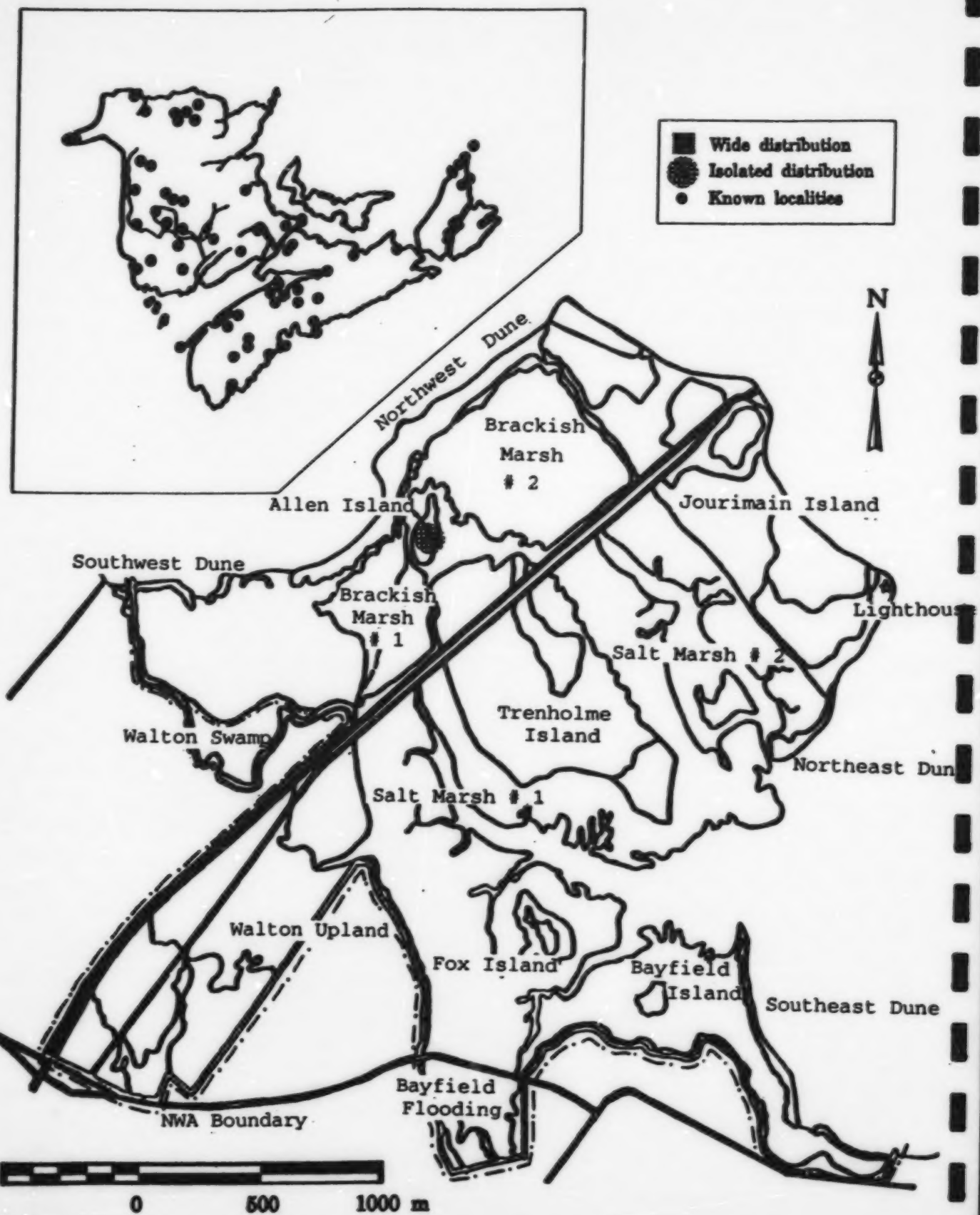
CJNWA: Found in low, grassy, disturbed areas in upland old fields, especially in vehicle tracks in areas with some salt-spray influence. Collected from coastal edge of Jourimain Island (880821-02), and on causeway between Trenholm Island and the mainland (880821-02, 890818-06).

Other records from Tormentine Peninsula: Found north of Ephraim Island (890916-08).

Maritime Habitat: Damp old fields, wet meadows, and low pastures.

Eastern N.A. Range: Introduced from western Eurasia. Confined to Maine, Maritime Provinces, and Newf. (?).

* Oryzopsis asperifolia Michx.



* Oryzopsis asperifolia Michx.

Maritime Provinces: In N.S., "scattered to common but never abundant, and rarer from Halifax Co. to Cape Breton". Not known from P.E.I. In N.B., "scattered throughout".

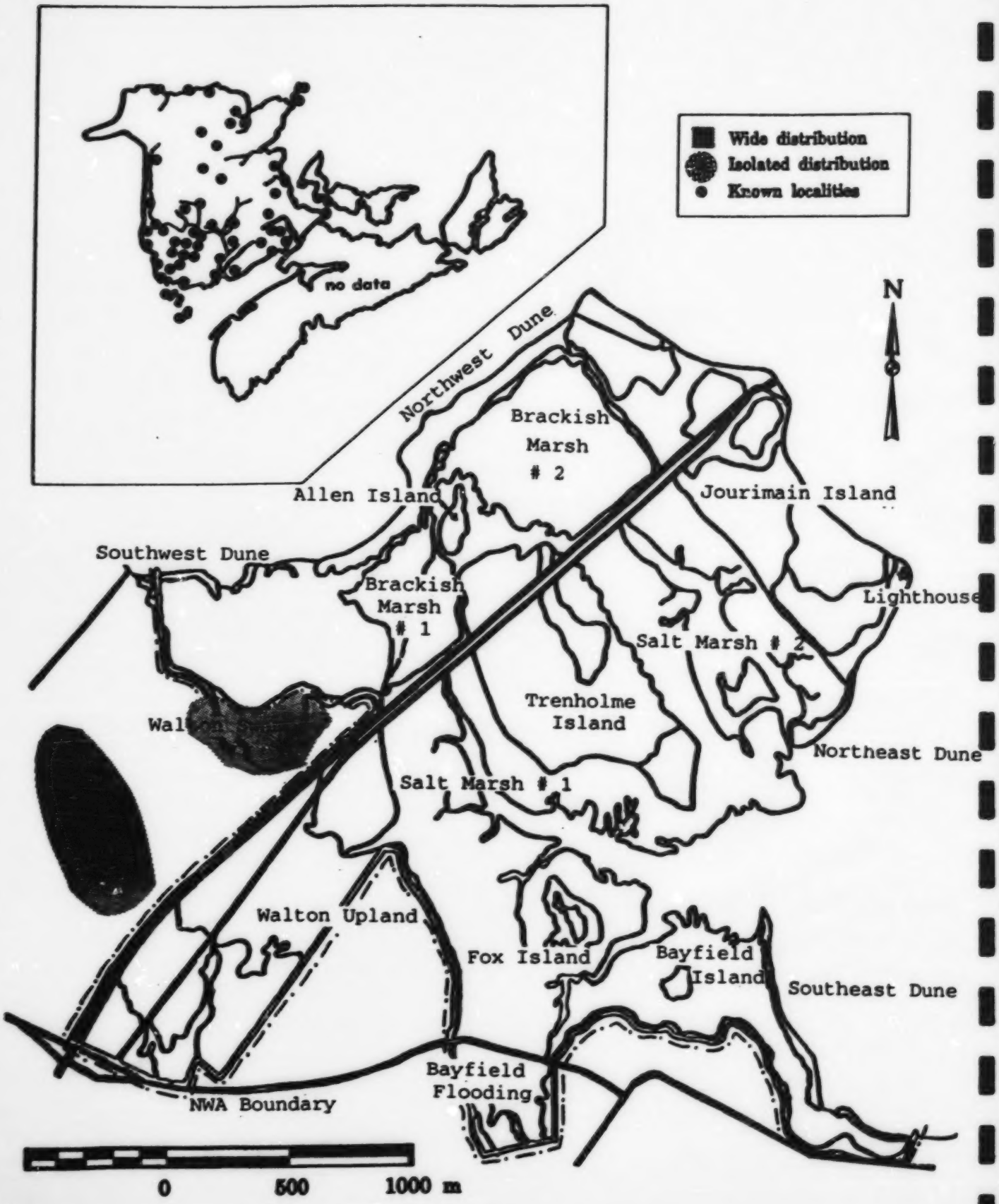
CJNWA: On Allen Island in relict hardwood forest. (880615-03)

Other records from Tormentine Peninsula: None.

Maritime Habitat: Open dry woods.

Eastern N.A. Range: Native. Found from West Virginia and Long Island to Newf., Anticosti Island, and Gaspé Peninsula.

* Osmunda regalis L.



* Osmunda regalis L.

Maritime Provinces: In N.S., "common throughout". On P.E.I., "scattered, rather scarce"; with only five localities. In N.B., most common in the southwest; with only four localities on the East Coast; at Shippegan and Miscou Islands, Gloucester Co., and two around Richibucto, Kent Co.

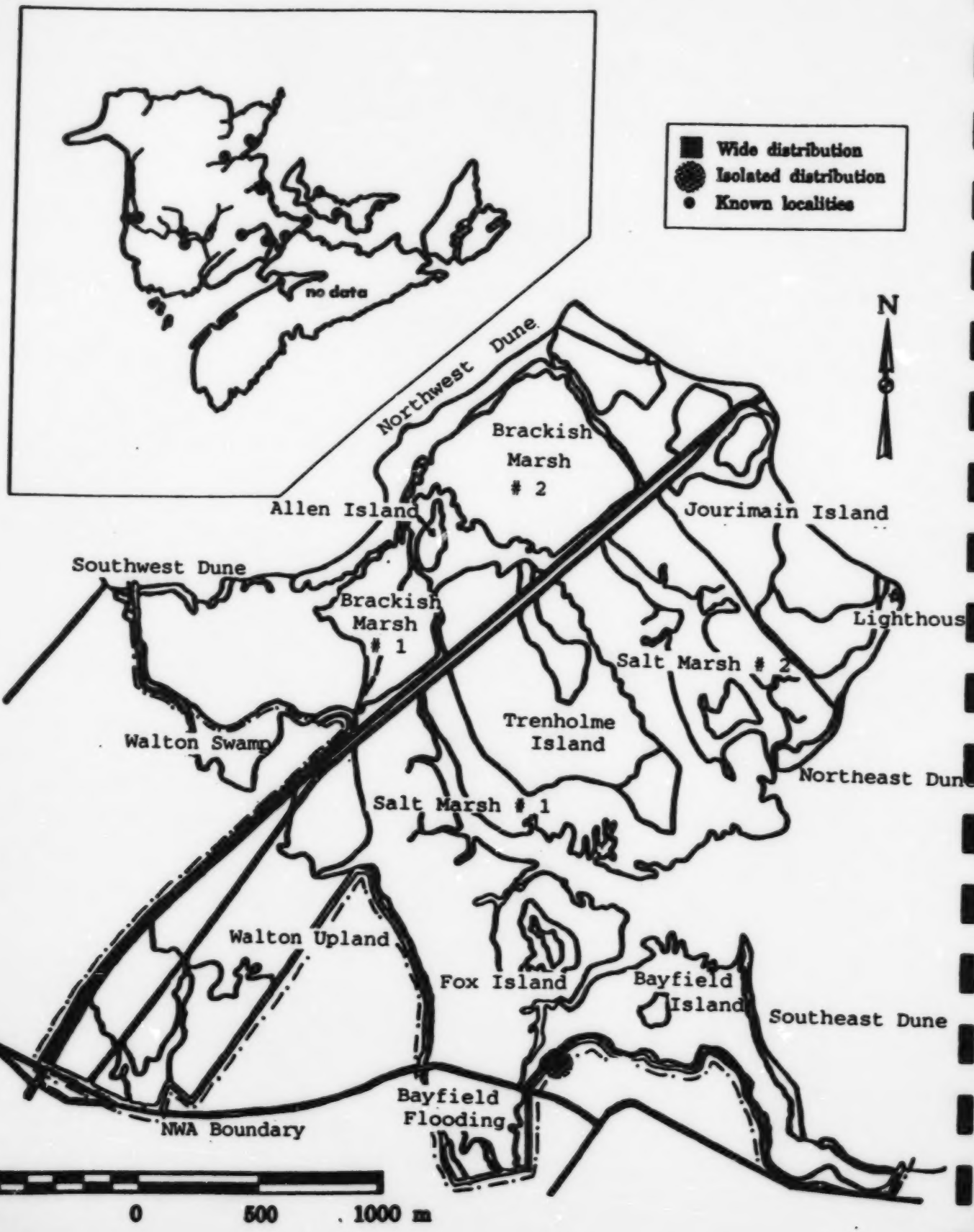
CJNWA: Extensively distributed and locally dominant in mixed forest of Upper Trenholm Swamp, with Acer rubrum, Alnus rugosa, and Ilex veticallata, with dominant Osmunda cinnamonea on hummocky forest floor. Locally, frequent but less extensive and prominent in swamp forest adjacent to Walton Swamp. Two isolated clones in Walton Swamp, outside coastal forest edge.

Other records from Tormentine Peninsula: In coastal Alnus rugosa swamp west of Raworth Beach (1986).

Maritime Habitat: Wet places; along streams next to running water, shores of lakes and marshes, or in openings in wet woods.

Eastern N.A. Range: Native. Southern. Found from Florida to Newf., Anticosti Island, Gaspé Peninsula, and Lake Mistassini, P.Q.

* Parthenocissus inserta (Kerner) Fritsch



* Parthenocissus inserta (Kerner) Fritsch

Maritime Provinces: In N.S., "rarely been collected by local botanists although it is occasional from Annapolis to Yarmouth...; near the river at Stewiake, Colchester Co., and probably elsewhere in the north-central part of the province". Found, in 1990, by Fairbanks and Harries in coastal forest edge habitat, near Pugwash, Cumberland Co., in association with Rhus radicans. On P.E.I., records have been referred to P. quinquefolia. In N.B., map shows scattered occurrences in the southern part. It is considered in the Maritimes to be introduced and not native.

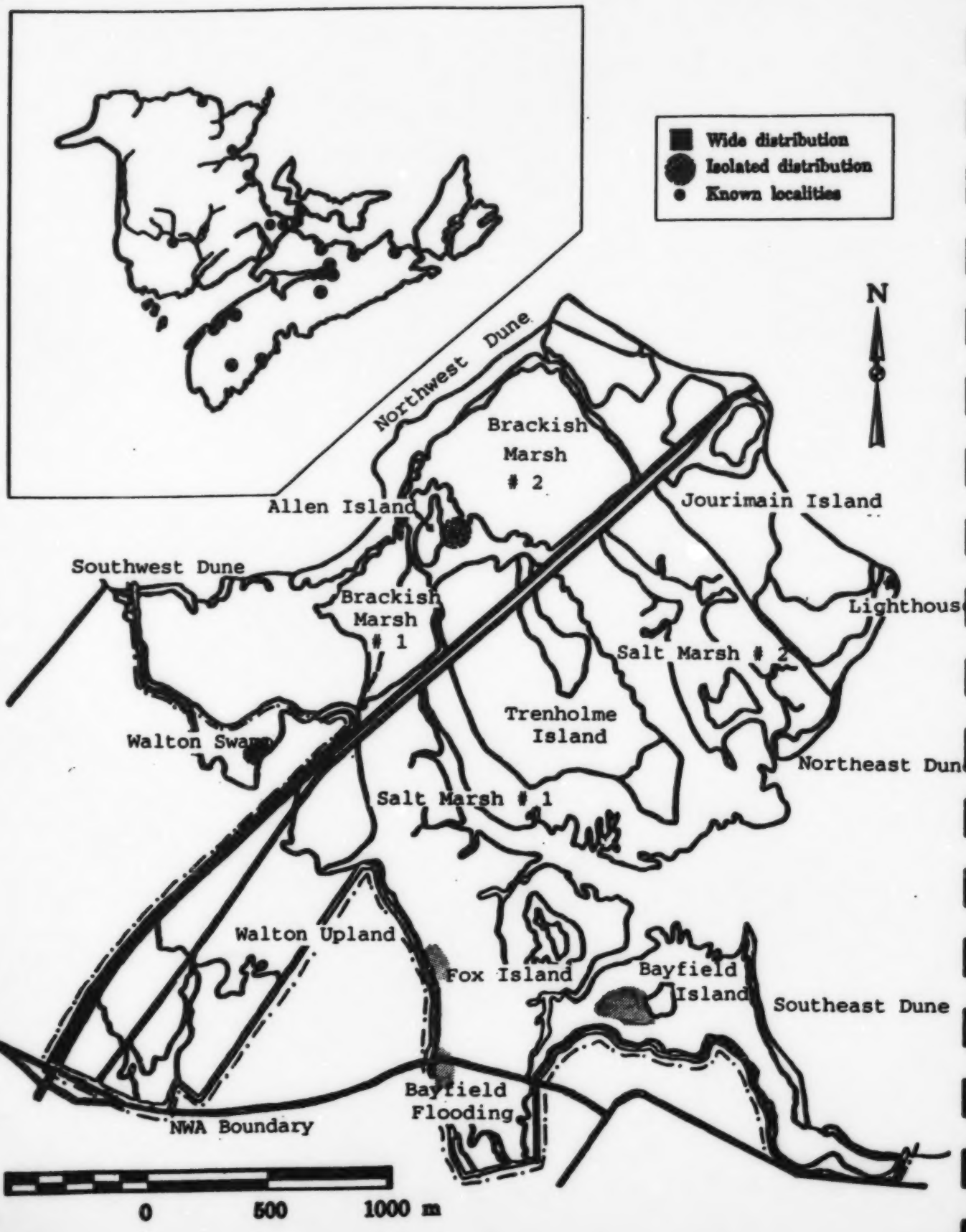
CJNWA: Found with Rhus radicans in coastal forest edge between salt marsh and Bayfield cemetary (890530-03).

Other records from Tormentine Peninsula: None.

Maritime Habitat: Cultivated; found around old houses and escaping to roadsides and waste places.

Eastern N.A. Range: Introduced from further west (?). Found from Penn., and southern New England, to N.S., N.B., and southern Quebec (north to Ville Marie, 47 20' N.)

* Phragmites australis (Cav.) Trin.



* Phragmites australis (Cav.) Trin.

Maritime Provinces: In N.S., "scattered along coasts", with an inland occurrence at a salt spring near Antigonish. On the North Shore only two localities, with three locations around Amherst, Cumberland Co. and Cobequid Bay. On P.E.I., only one locality, at the landward edge of a salt marsh on the Northumberland Strait at Dunk River, Prince Co.. In N.B., only six localities, four of them along the East Coast; with one each at Miramichi Bay, and in Kent Co., and two inland in Westmorland Co..

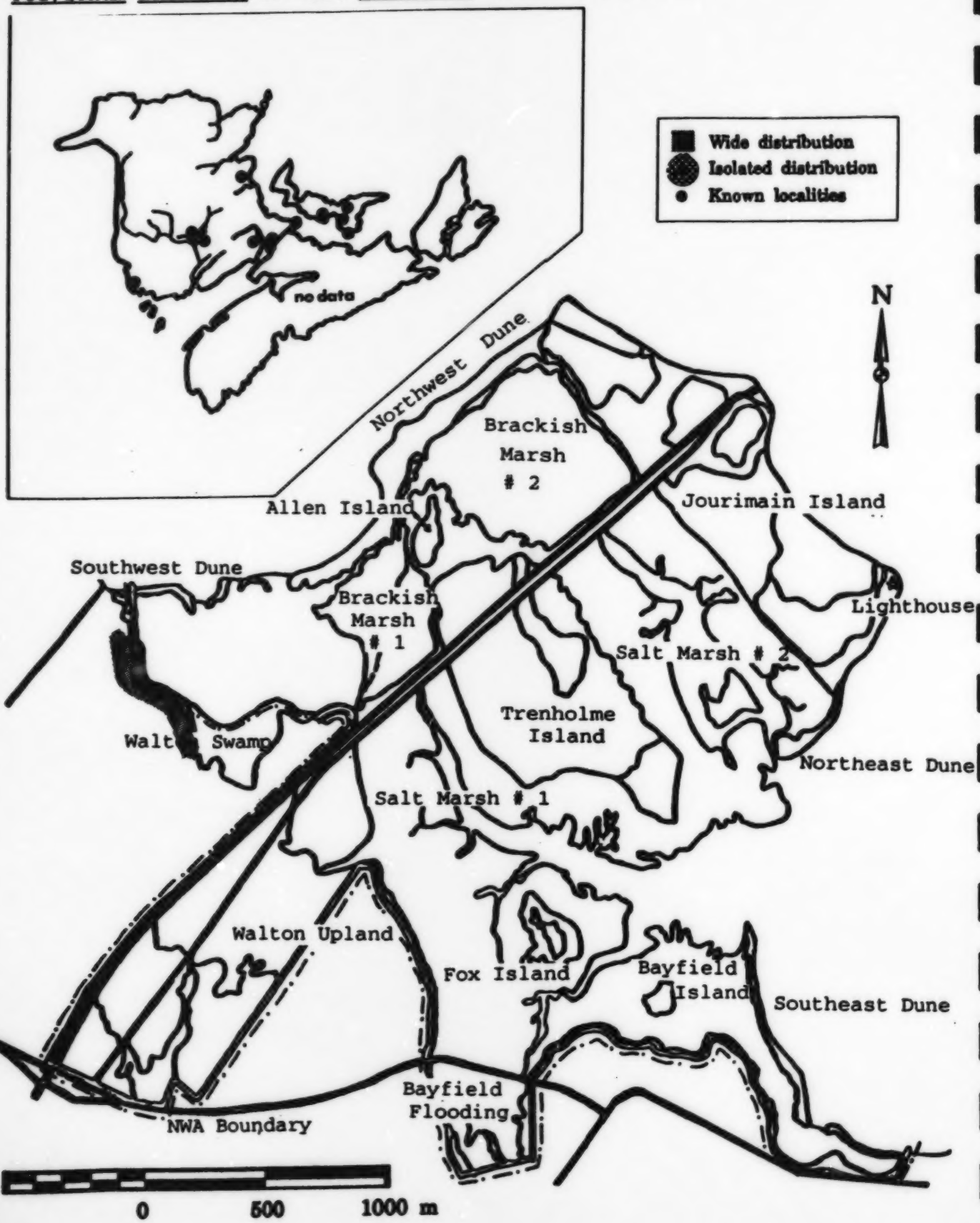
CJNWA: Five colonies in brackish vegetation landwards of the salt marsh. Each colony composed of a single continuous stand (formed by a single clone?). The three stands on the landward edge of Saltmarsh # 1 are extensive and vigorous. The stand in the lower part of Walton Swamp is non-vigorous, with low, widely spaced, and largely sterile shoots. Its location is distant from any recent enriching influence of tidal flooding. The stand near Allen Island is within salt marsh vegetation with Spartina pectinata, Festuca rubra, and Solidago sempervirens. It is composed of only a few low, widely spaced, and sterile shoots (880817-01).

Other records from Tormentine Peninsula: Isolated stands elsewhere along the coast, at the upper edge of the salt marsh, west of Cape Bruin, east side of Peacock Cove, at Oulton Brook, and west of Ephraim Island.

Maritime Habitat: Upper borders of salt marshes, brackish marshes, boggy areas, and wet ditches.

Eastern N.A. Range: Native. Southern. Found from Maryland to mainland N.S., P.E.I., Anticosti Island, and Gaspé Peninsula.

* Polygonum arifolium L. var. pubescens (Keller) Fern.



* Polygonum arifolium L.

Maritime Provinces: In N.S., "scattered to local" in central part including Kings, Colchester, and Cumberland counties. On P.E.I., "rare in south and southeast" with only four localities. In N.B., "rare" with a few isolated stations in southern part of province. Recorded at two isolated stations, in swamp forests, at the head of the Chignecto Coastal Marshes, on both sides of the N.B.-N.S. border. (H. Harries, unpublished info.)

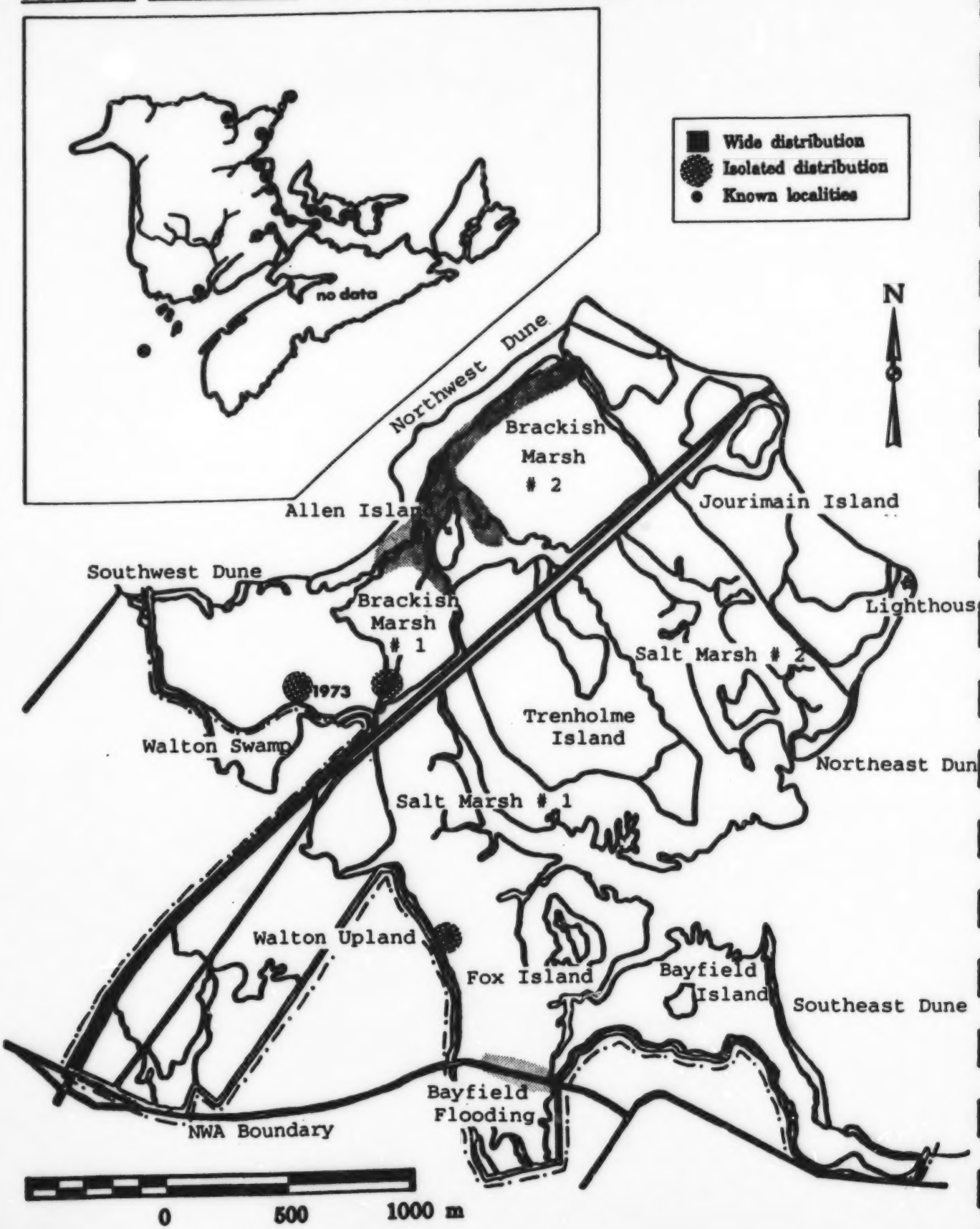
CJNWA: An extensive population in mixed swamp forest, along the western edge of the Walton Swamp, where it is luxuriant and locally prominent (890807-01).

Other records from Tormentine Peninsula: An extensive population in red maple swamp forest in the Lower Trenholm Swamp east of Peacock Cove.

Maritime Habitat: Swampy areas and marshy borders of thickets.

Eastern N.A. Range: Native. Southern. Found from Delaware and Maryland to mainland N.S., P.E.I., N.B., and Quebec City district.

* Polygonum ramosissimum Michx.; syn.: P. exsertum Small



*Polygonum ramosissimum Michx.; syn.: P. exsertum Small

Maritime Provinces: In N.S., "common around the head of the Bay of Fundy and along Northumberland Strait; rare elsewhere". On P.E.I., only at five localities, all in salt marshes along Northumberland Strait. In N.B., "uncommonly scattered along the east coast" (8 localities south of Miscou), and "rare on the Bay of Fundy" with only five localities.

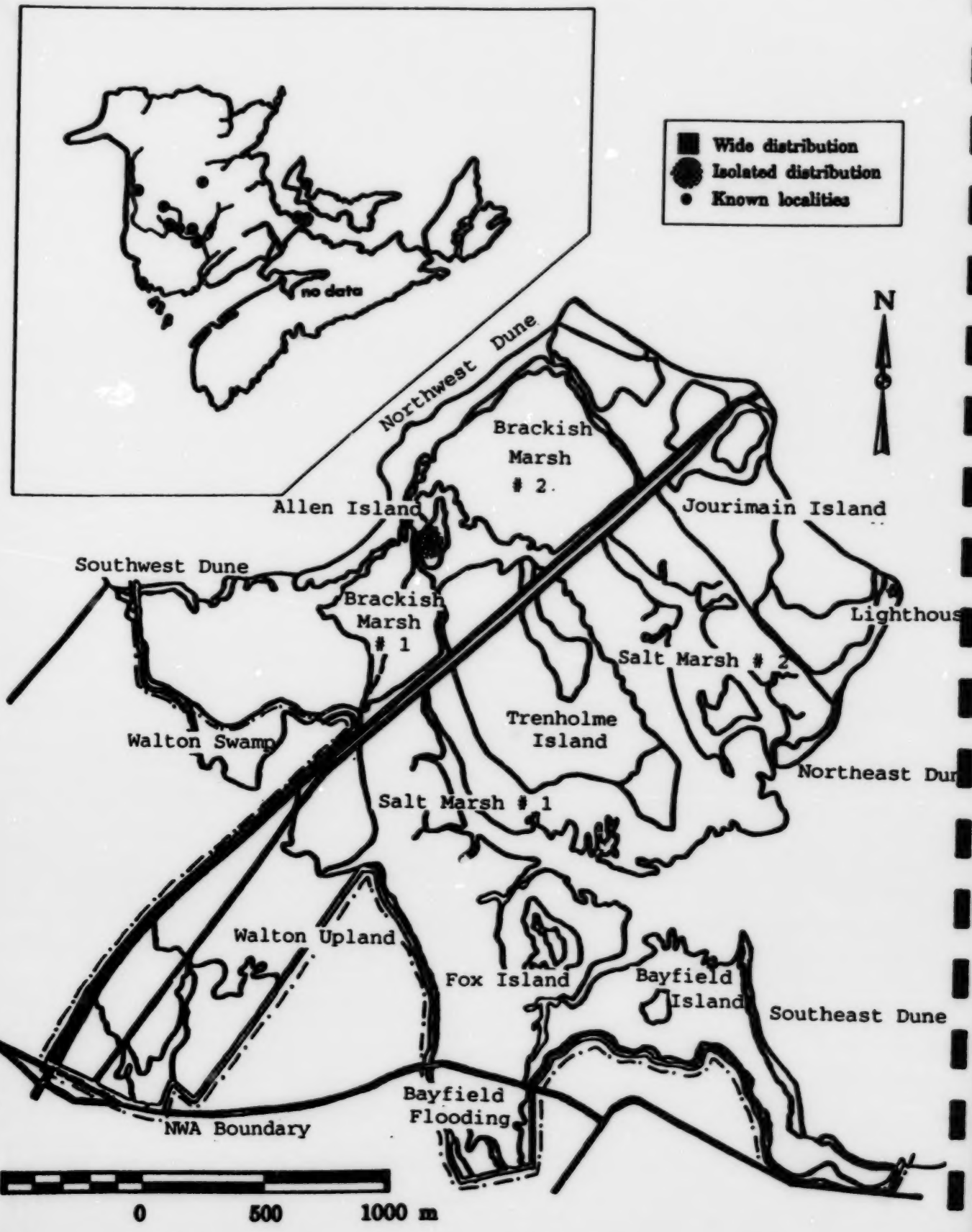
CJNWA: One extensive colony noted around the edge of the two Brackish Marsh impoundments in disturbed and decadent salt marsh vegetation, from upper Spartina alterniflora marsh, across the S. patens belt, into the Juncus balticus belt, together with other "disturbance plants", e.g. Galium trifidum var. halophilum. Away from the enriching influence of the impoundment increasingly dwarfed, occasionally forming carpets of diminutive plants (880818-05). Two other colonies; near the mainland edge of Salt Marsh # 1; near Bayfield on wrack between salt marsh and highway embankment, and further northwest in disturbed areas near the landward edge of the salt marsh. Collected in 1973 in the Southwest Marsh (73003).

Other records from Tormentine Peninsula: Present in both the East and West Marshes at Cape St. Laurent, in disturbed areas near the banks of tidal creeks (890701-02, 890916-17).

Maritime Habitat: Sandy places; edges of salt or brackish marshes, shores, and ditches.

Eastern N.A. Range: Native. Southern. Found from Delaware to N.S. (including Cape Breton Island), P.E.I., and N.B.

** Polygonum scandens L.



** Polygonum scandens L.

Maritime Provinces: In N.S. restricted to the north-central part where it occurs in river-intervales and "has been collected in only a few places". On P.E.I. only a single locality, along a stream at Campbell's Mills, Queen's Co.. In N.B. "locally common only in the SW Miramichi, St. John and St. Croix River valleys" in "alluvial meadows and thickets".

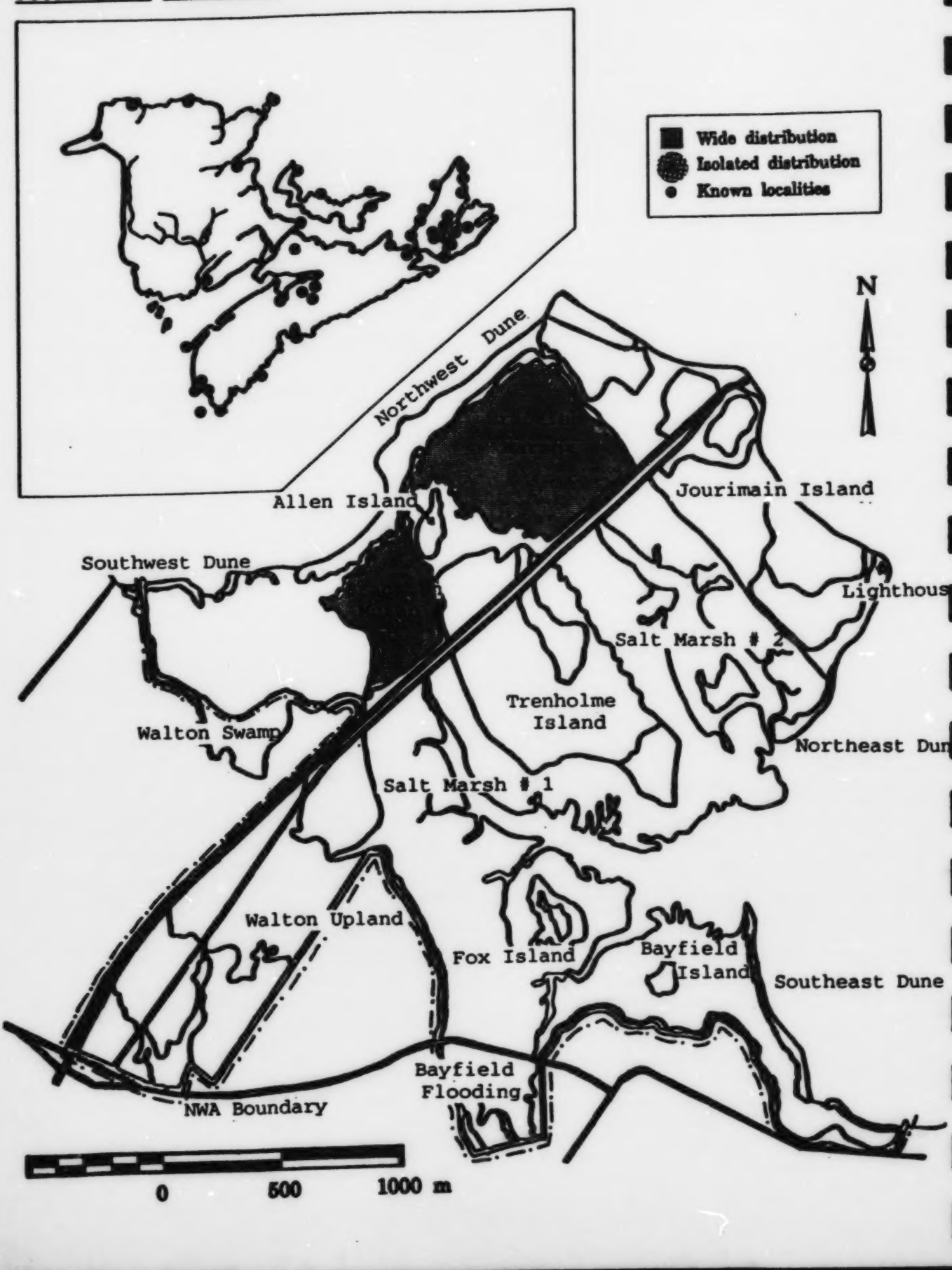
CJNWA: Known only by a single patch at Allen Island in the shrub fringe between the hardwood forest and surrounding salt marsh (860921-04). Not observed 1988 or 1989; probably overlooked.

Other records from Tormentine Peninsula: One large and discontinuous patch to the southwest of Shemogue Head on an eroding coastal till slope, with Calamogrostis canadensis, Spiraea alba, and Senecio sylvaticus (890812-14).

Maritime Habitat: Alluvial meadows and damp thickets.

Eastern N.A. Range: Native. Southern. Found from Florida to mainland N.S., P.E.I., southern N.B., and southern Quebec (Lac St.Pierre); also in Newf.

* Potamogeton pectinatus L.



* Potamogeton pectinatus L.

Maritime Provinces: In N.S., scattered localities, especially on Cape Breton Island. Found also in gypsum areas of mainland, for example, at a salt lake at Oxford, Cumberland Co., with no occurrences along the North Shore. On P.E.I., only four localities, none along Northumberland Strait. In N.B., "rare throughout", with only five localities, two on the East Coast, at Miscou, Gloucester Co., and in the Miramichi estuary, Northumberland Co..

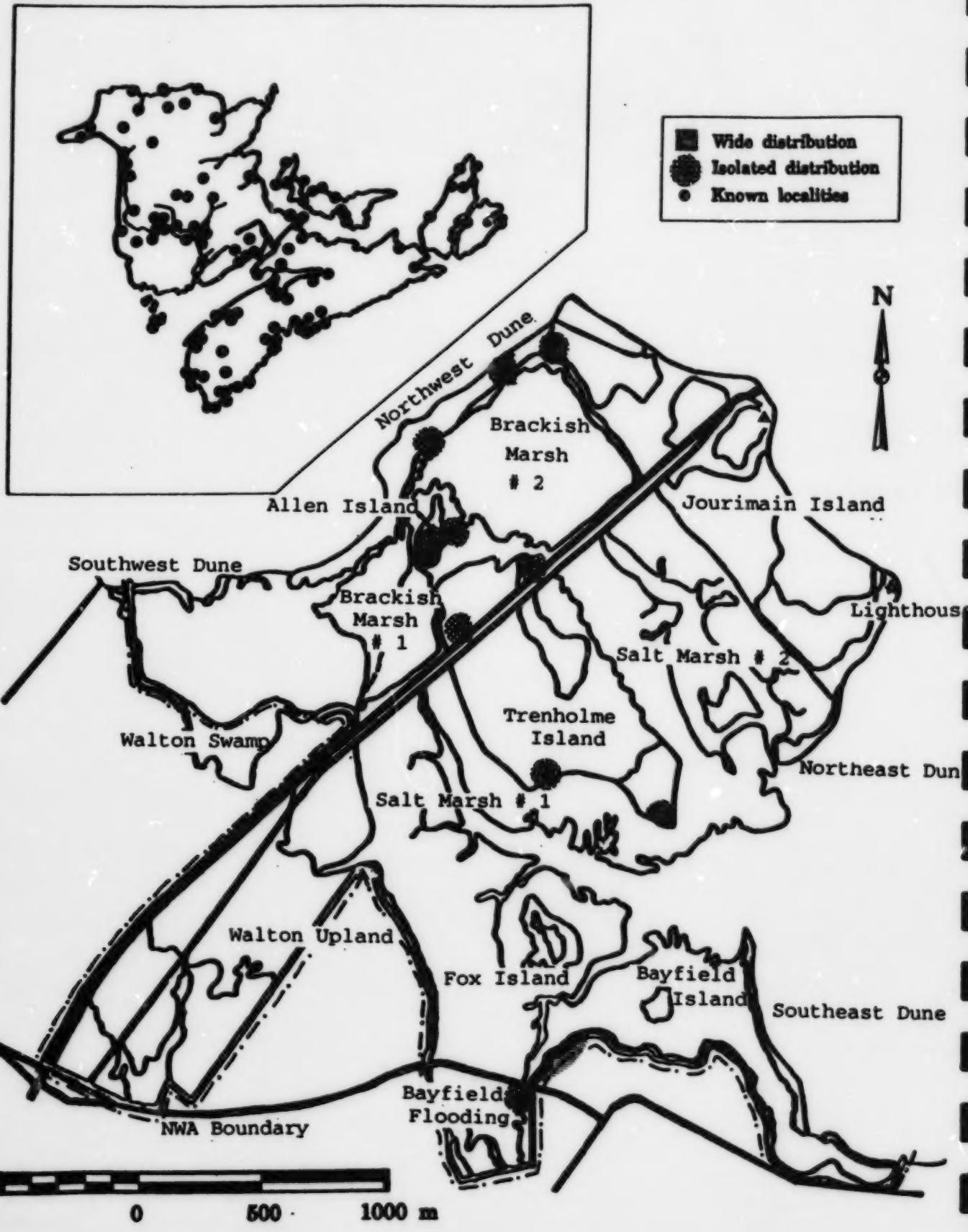
CJNWA: In 1973 to 1975 reported as dominant aquatic in Brackish Marsh # 2 towards Brackish Marsh # 1, overlapping with the more halophytic Ruppia maritima. Less prominent in 1988-1990 in both impoundments.

Other records from Tormentine Peninsula: None.

Maritime Habitat: Found in brackish, alkaline, mostly still waters.

Eastern N.A. Range: Native. Found from Florida to Newf. and Ungava (to Larch River, ca. 57 35' N.).

* Rhus radicans L. var. rydbergii (Small)Rehd.



* Rhus radicans L. var. rydbergii (Small)Rehd.; syn. Toxicodendron rydbergii (Small) Greene.

Maritime Provinces: In N.S., "scattered throughout the Province, northward to northern Cape Breton and Cumberland Co". On P.E.I., "local; usually near coast", with 11 localities. In N.B, "common in the St. John R. drainage system and scattered elsewhere throughout the Province". Only one locality on East Coast, in Kouchibouguac Park area, Kent Co., with none in Westmorland Co..

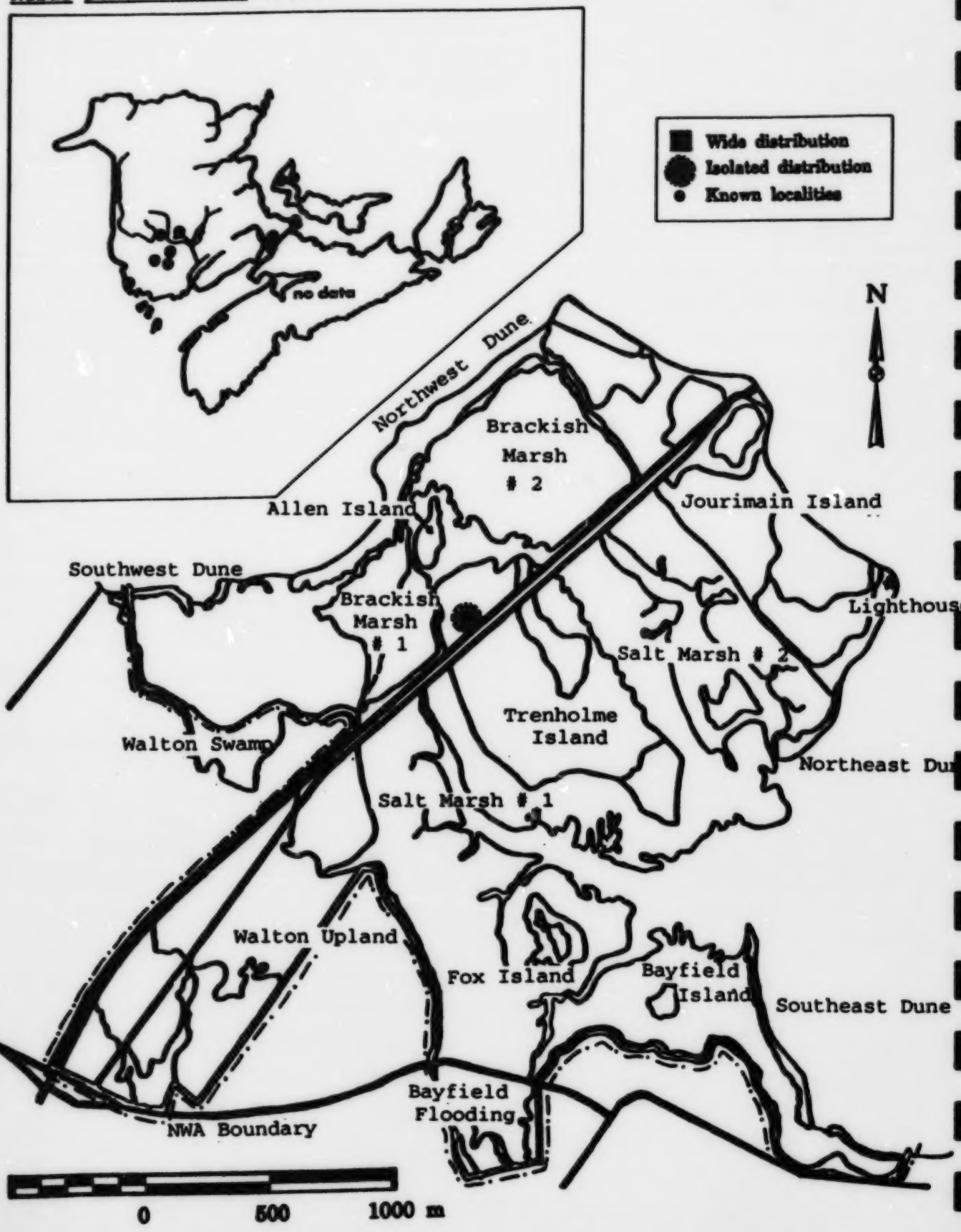
CJNWA: Fourteen isolated colonies, most at or near coastal forest edge, in the transition between salt marsh and well-drained uplands, with the largest colony at Allen Island. Here it is common and locally dominant along the outer edge of the coastal shrub fringe, extending seaward into the upper edge of the salt marsh, with dominant Spartina pectinata. Two colonies on the Northwest Dune, in Myrica pensylvanica shrub "islands", occurring between the shrubs and extending into surrounding Ammophila community.

Other records from Tormentine Peninsula: Found south of Shemogue Head, at Oulton Brook, and at Cape St. Laurent's East Marsh; all in salt marsh edge of forest. In red maple forest with Caltha palustris and Polygonum arifolium of Lower Trenholm Swamp east of Peacock Cove.

Maritime Habitat: Sandy or rocky places; including moist woods, thickets, lake edges and wet roadsides.

Eastern N.A. Range: Native. Found from West Virginia mountains and southern New England, to Cape Breton Island, P.E.I., Gaspé Peninsula, and Lac St. Jean.

* Rubus pensilvanicus Poir.



* Rubus pensilvanicus Poir.

Maritime Provinces: In N.S., "rather common in southwestern N.S., scattered eastward". On P.E.I., only reported at Murray River, and near Alberton, Prince Co. In N.B., "uncommon", restricted to southwestern and southcentral parts. Recorded in the southeast, in marsh-edge habitat, at Sackville, Westmorland Co. (H. Harries, unpublished info.)

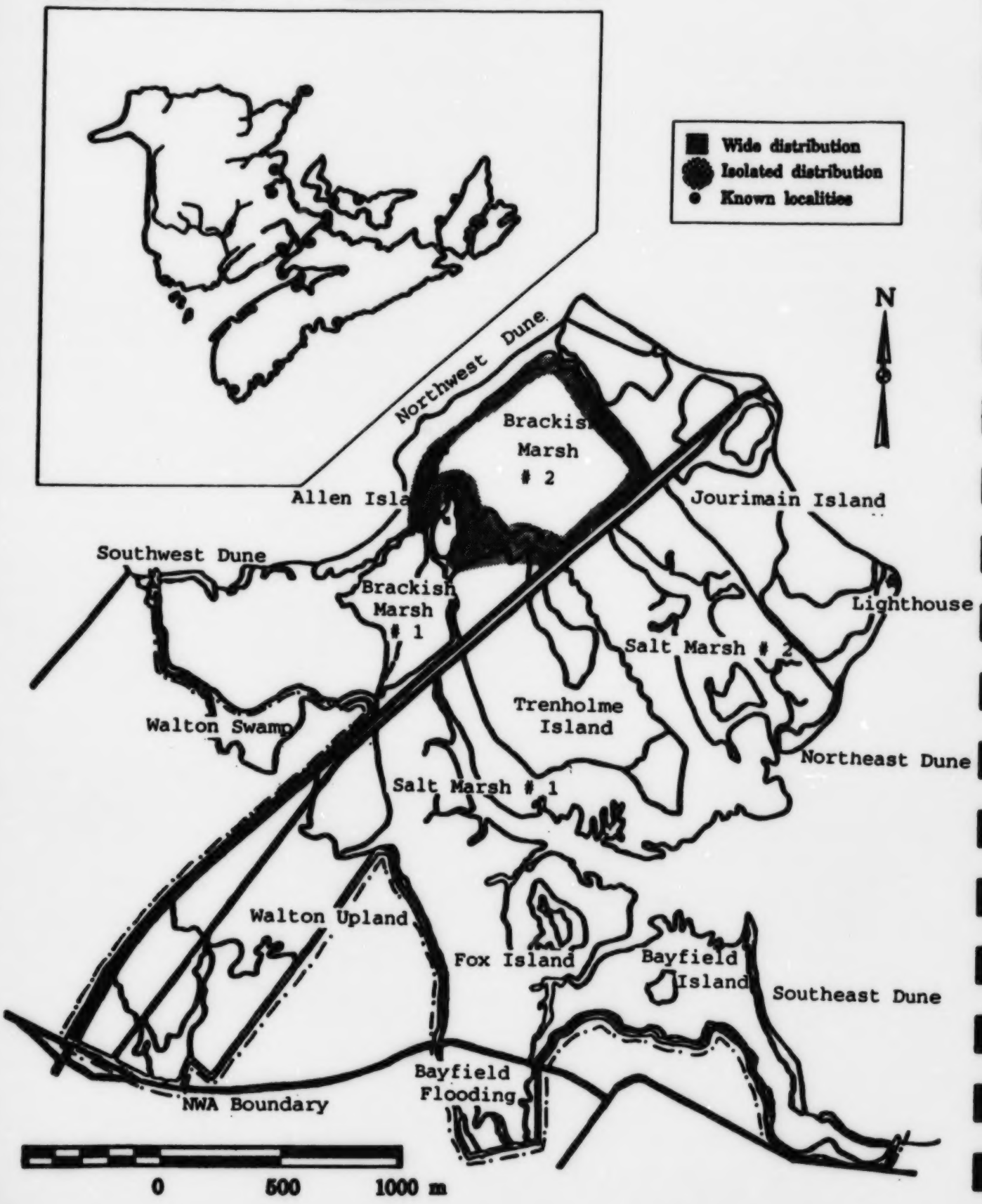
CJNWA: Found at edge of track through second-growth forest on Trenholm Island west of causeway (890706-01). The small size of the patch and track edge habitat suggestive of recent establishment.

Other records from Tormentine Peninsula: None.

Maritime Habitat: Clearings, roadsides and steep banks.

Eastern N.A. Range: Native. Southern. Found from Virginia to southwestern Newf., P.E.I., southern N.B., and southern Quebec.

* Rumex maritimus L. var. fueginus (Phil.) Dusen



* Rumex maritimus L. var. fueginus (Phil.) Dusen

Maritime Provinces: In N.S., a few scattered coastal localities along the South Shore and on Cape Breton Island; "rare from Amherst to Advocate in Cumberland Co., to Shelburne Co.". On P.E.I., only a single North Shore locality. In N.B., "rare; scattered along the east coast and Bay of Fundy", with only five localities. Along the East Coast, three localities, from the Richibuctou River, Kent Co. to Miscou Island, Gloucester Co..

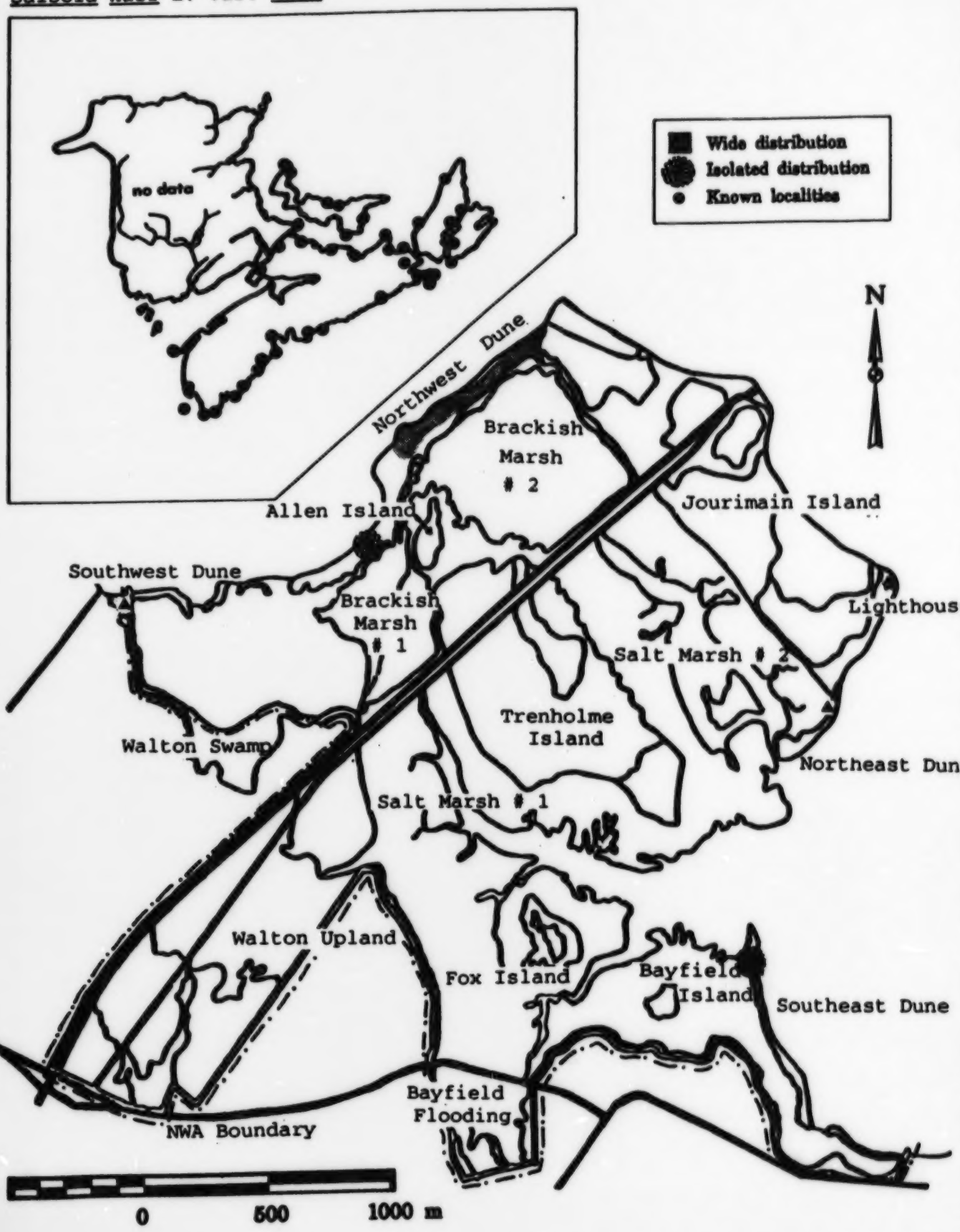
CJNWA: One extensive colony around Brackish Marsh # 2. Within this area very rare; only four isolated plants found in 1988 (880818-04), but more frequent in 1989. Extent of the colony identical with that of the local much more common Aster subulatus. Like this species confined to the highly disturbed and nutrient-enriched zone along the shore of the impoundment. In 1989, additional plants were found near the upper edge of the beach between the Southwest Dune and the head of Peacock Cove, located just outside the CJNWA boundary (890811-07, 890902-01).

Other records from Tormentine Peninsula: Found on the upper edge of the beach southwest of Shemogue Head. (890812)

Maritime Habitat: Saline, brackish, and alkaline marshes and shores, and as a weed on waste ground.

Eastern N.A. Range: Native. Southern. Found from Long Island N.Y., to Cape Breton Island, P.E.I., Anticosti Island, and Gaspé Peninsula.

* Salsola kali L. var. kali



* Salsola kali L. var. kali

Maritime Provinces: In N.S., scattered along the coasts, including the North Shore, with three localities in Cumberland Co.. On P.E.I., six localities along coast, with only one of them on the Northumberland Strait, at Wood Island, King's Co.. In N.B., "uncommonly scattered along the coast".

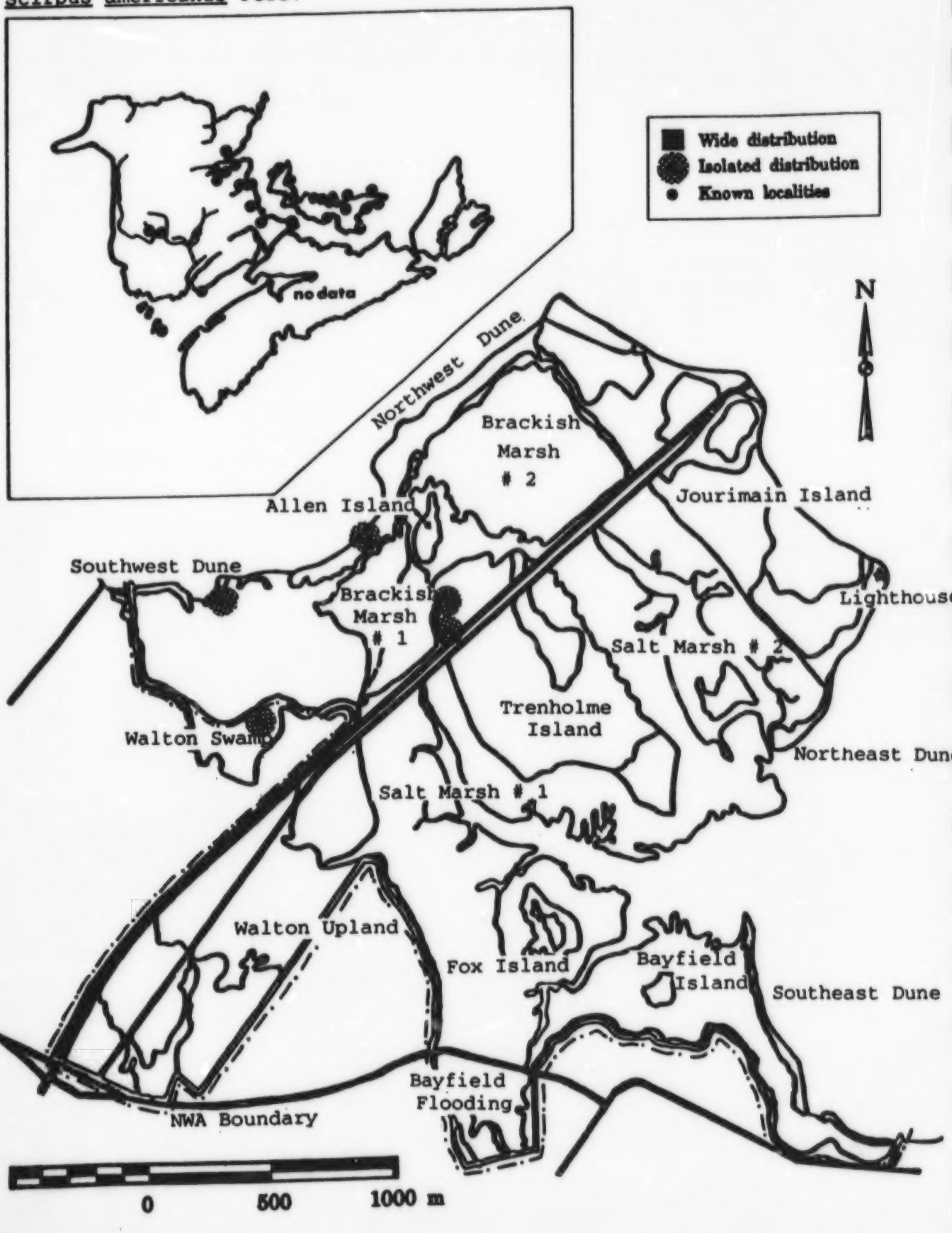
CJNWA: Generally associated with Cakile edentula. One colony in the Northwest Dune area, with scattered plants found on both the upper beach and on the eroding seaward slope of the dune. Occasional adventitious plants elsewhere on the upper beach of the southwestern extension of the Northwest Dune and on the Northeast Dune. In 1989, found along Southwest Dune near extreme western corner of CJNWA.

Other records from Tormentine Peninsula: None

Maritime Habitat: Sandy and gravelly beaches.

Eastern N.A. Range: Native. Southern. Found from Florida to Newf. and Côte-Nord.

* Scirpus americanus Pers.



* Scirpus americanus Pers.

Maritime Provinces: In N.S., "common...near the coast". On P.E.I., "coastal...almost absent from Northumberland Strait shore". In N.B., "common on the east coast, uncommon elsewhere", with mapped occurrences limited to section between Shediac Bay and Miramichi Bay.

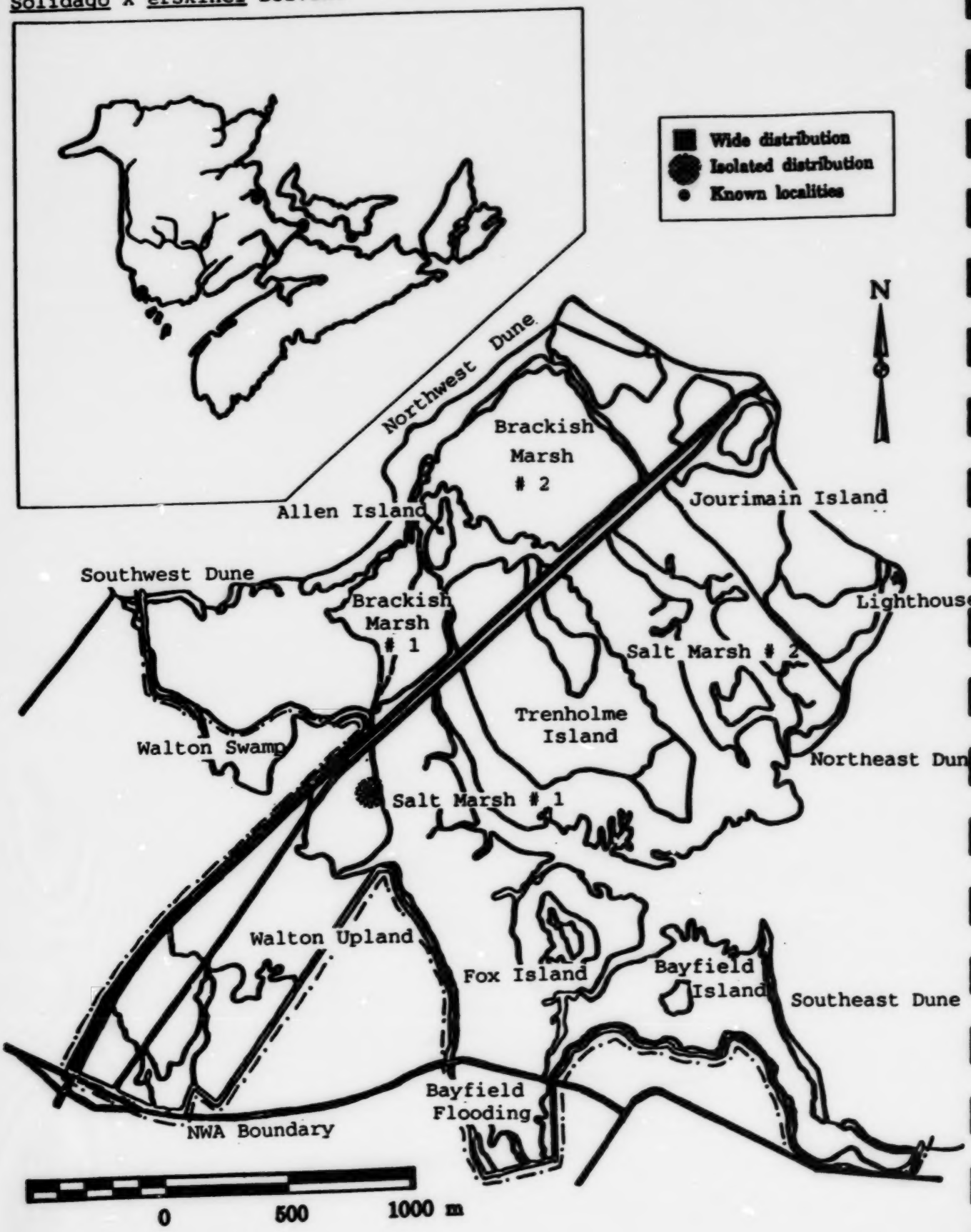
CJNWA: . An extensive population along the upper edge of the salt marsh and in transition from salt marsh to beach, along the seaward and landward edges of the Southwest Marsh and Brackish Marsh #1. It is composed of scattered patches which appear like relicts of a formerly more extensive and continuous distribution (880817-08).

Other records from Tormentine Peninsula: A population on the eastern shore of Peacock Cove, just west of CJNWA (890811-10).

Maritime Habitat: Found on brackish marshes and occasionally bogs near coast, and on P.E.I. in dune slacks and sandflats.

Eastern N.A. Range: Native. Southern. Found from Florida to Newf. and Côte-Nord.

* Solidago X erskinei Boivin.



* Solidago X erskinei Boivin. (S. canadensis X S. sempervirens)

Maritime Provinces: Not reported from N.S. On P.E.I., known only from type locality at Wood Island, King's Co. In N.B., "reported from Kouchibouguac National Park, Kent Co., and from St. Andrews, Charlotte Co.".

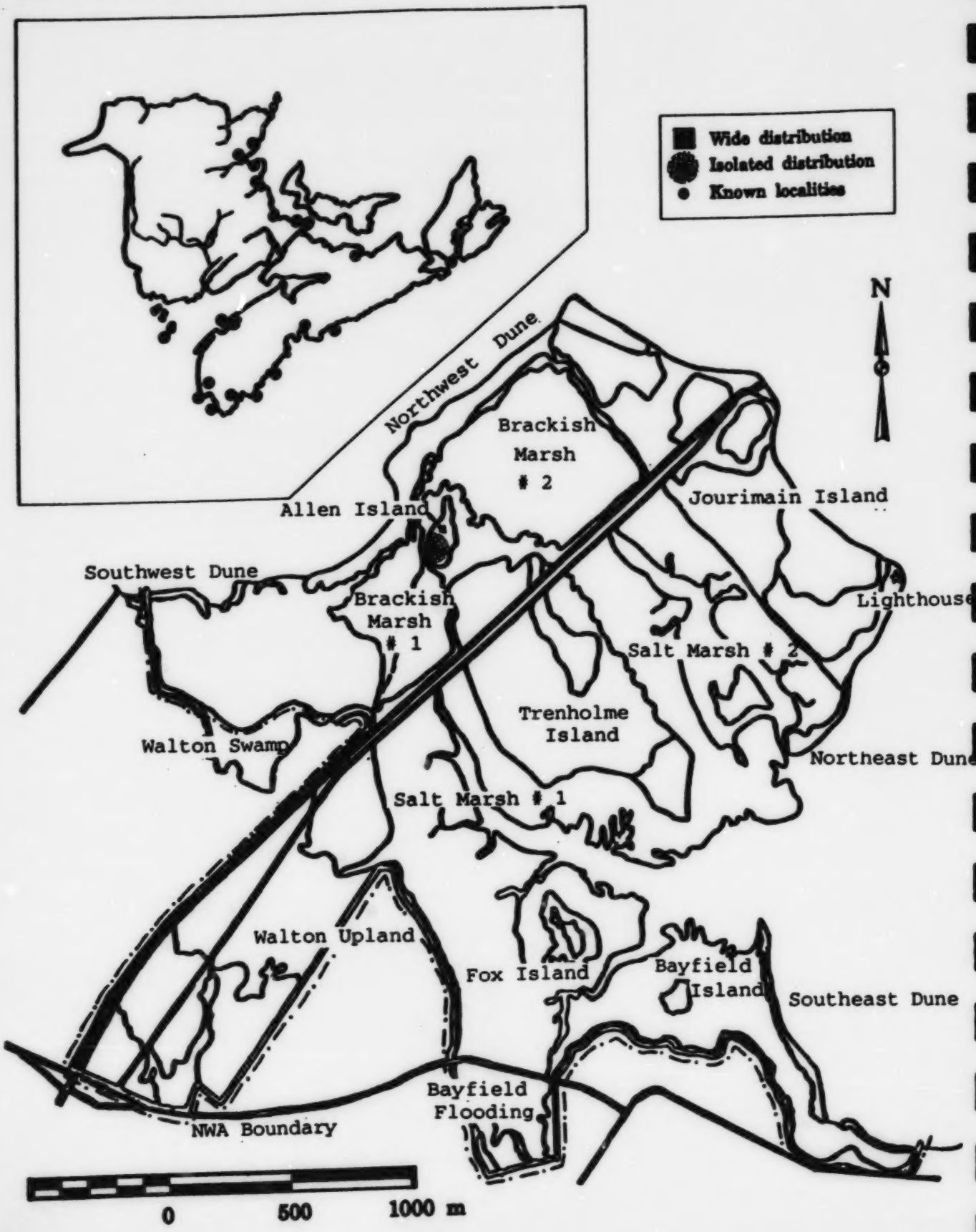
CJNWA: Known only by a single plant, associated with dominant S. canadensis, in upland oldfields just west of Salt Marsh #1 (880824-01). Plant noted to be flowering later than the latter species.

Other records from Tormentine Peninsula: None.

Maritime Habitat: Reported from P.E.I., on shoulder of road across from a salt flat.

Eastern N.A. Range: Native. So far only reported from the Maritime Provinces.

* Teucrium canadense L.



* Teucrium canadense L.

Maritime Provinces: In N.S., "rather rare and scattered", mainly in the southern half, with one locality each on Cape Breton Island and on the North Shore in the New Glasgow area, Pictou Co.. On P.E.I., only one report from 1891 (McSwain and Bain) that "requires confirmation" (Scoggan, 1978-79). In N.B., rare, with one locality on Grand Manan Island and five localities along the East Coast; in Kent and Northumberland Counties.

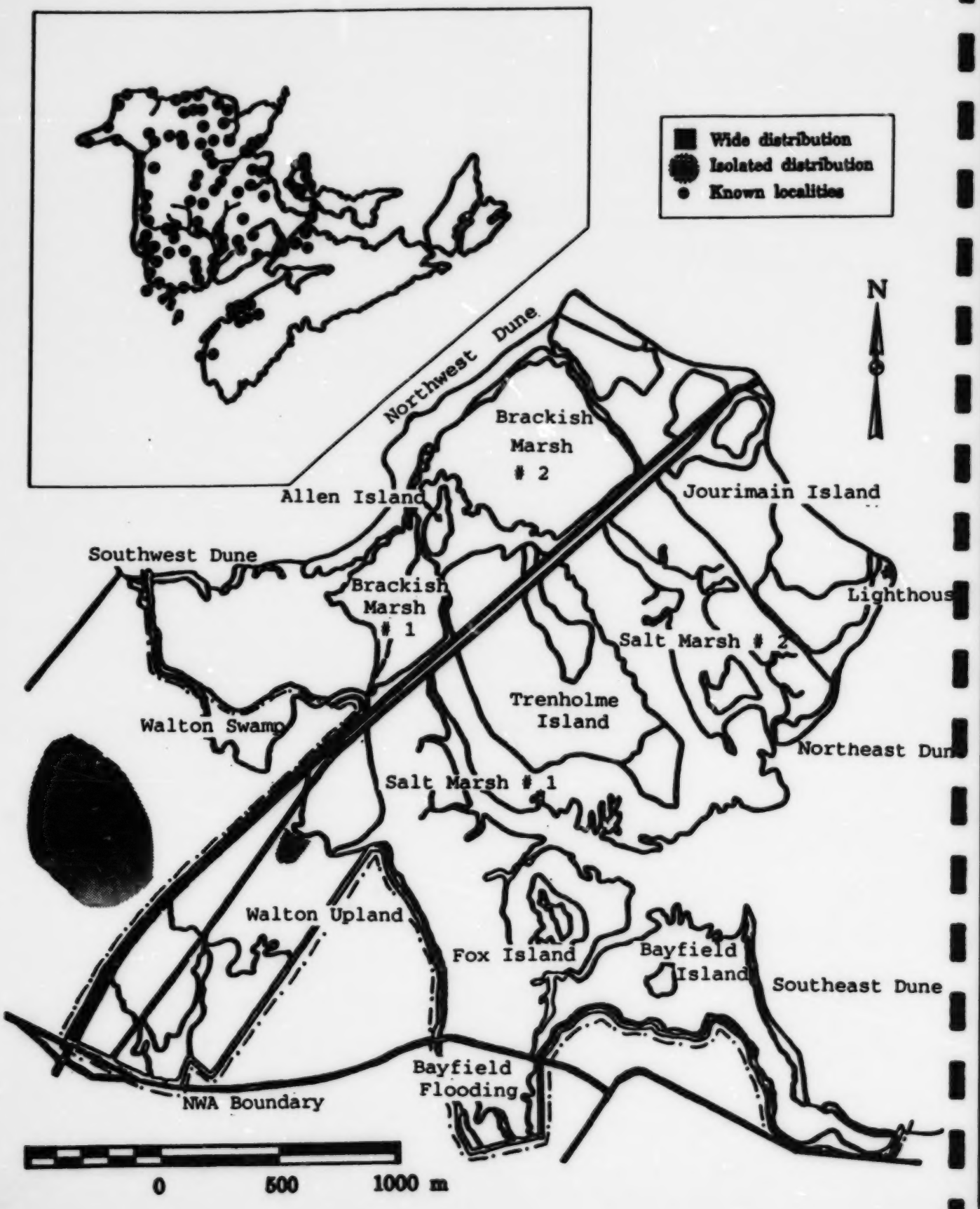
CJNWA: Found at southwestern edge of Allen Island, just outside of coastal shrub fringe in Festuca rubra zone, with Ligusticum scoticum, Rhus radicans, Convovulus sepium, Achillea millefolium, Spartina pectinata, and Juncus balticus. Present in one large continuous patch (890816, 860921-01, 73002).

Other records from Tormentine Peninsula: Large patch is present throughout a dune scrub thicket between Shemogue Head and Duguay Point (890812-10).

Maritime Habitat: Coastal sands, gravelly seacoasts, crests of barrier beaches, thickets and woods.

Eastern N.A. Range: Native. Southern. Found from Georgia to Cape Breton Island, northeastern N.B., and Quebec City area.

* Thuja occidentalis L.



*Thuja occidentalis L.

Maritime Provinces: In N.S., two isolated areas in the southwestern counties. Recently recorded for Cumberland Co. in the northcentral part, including several localities in the Oxford area, and one occurrence each, at Lorneville and at Amherst Point (W.B. Fairbanks and H. Harries, unpublished info.). On P.E.I., found throughout the northwestern part, eastward to Summerside area. In N.B., "common throughout".

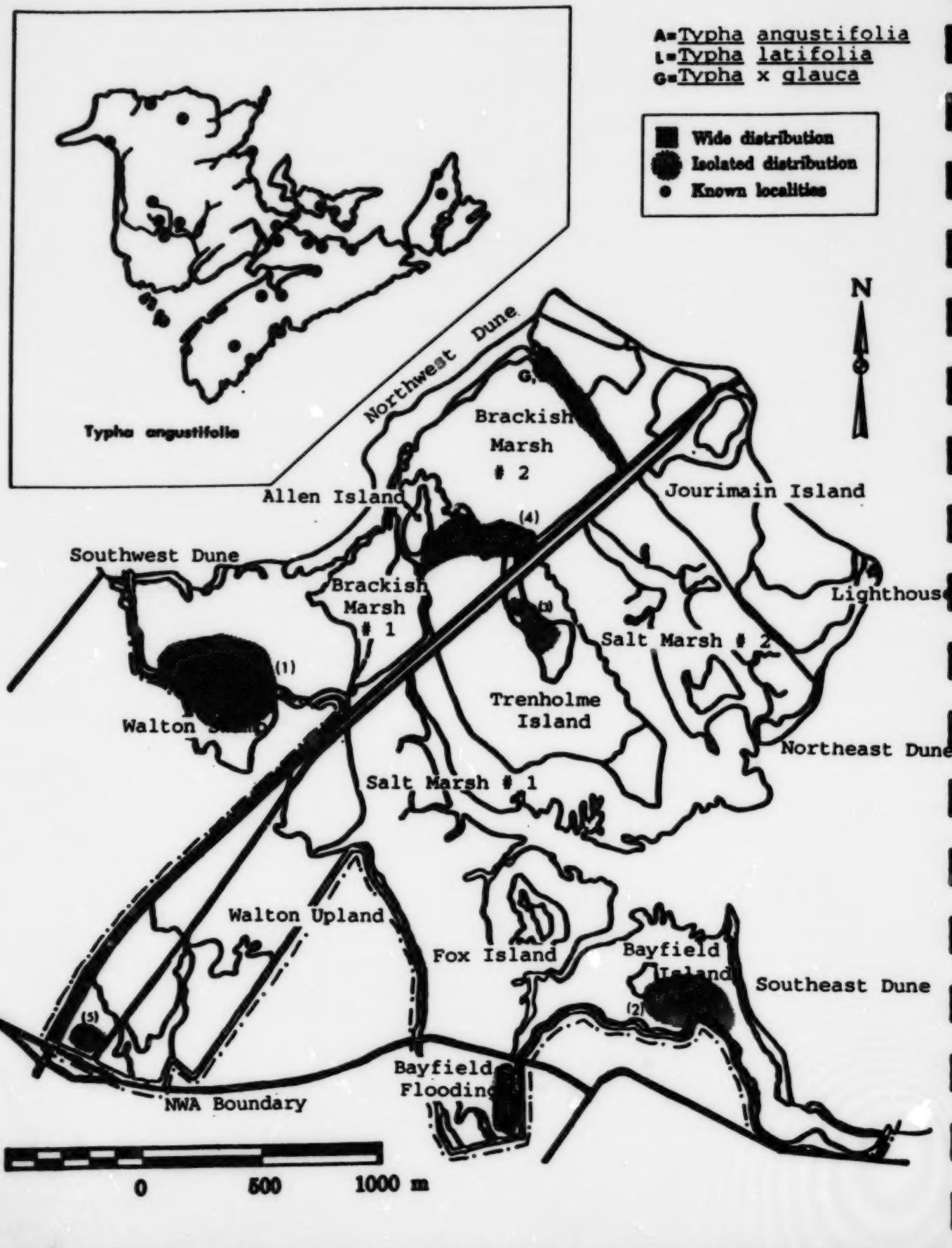
CJNWA: Two isolated populations in swamp forest with, or next to dominant red maple. One population forms a small "cedar swamp" in the Walton Upland Swamp, including some trees with 30 cm. d.b.h. A second population is located in the Upper Trenholm Swamp. This population is more extensive but with a lesser degree of dominance. Cedars extend here marginally into an adjacent black spruce forest (890502-01).

Other records from Tormentine Peninsula: None.

Maritime Habitat: Chiefly in calcareous areas in swamps or lake sides, and in ledge crevices.

Eastern N.A. Range: Native. Found from North Carolina, Conn., and southwestern Maine, to western N.S., P.E.I., Anticosti Island, and Gaspé Peninsula.

* Typha


A=Typha angustifolia
L=Typha latifolia
G=Typha x glauca
Wide distribution
Isolated distribution
Known localities
Typha angustifolia
N
Northwest Dune
Brackish Marsh # 2
Allen Island
Jourimain Island
Southwest Dune
Brackish Marsh # 1
Lighthouse
Salt Marsh # 2
Trenholme Island
Walton Island
Northeast Dune
Salt Marsh # 1
Walton Upland
Fox Island
Bayfield Island
Southeast Dune
Bayfield Flooding
NWA Boundary
0
500
1000 m

* Typha angustifolia L.
  Typha latifolia L.
* Typha x glauca godr. (= T. angustifolia x T. glauca)

Identification: Only fertile patches were identified to species.

Maritime Provinces: T. latifolia: In N.S., "common throughout". On P.E.I., "throughout". In N.B., "scattered throughout except in the extreme northern section", with only five locations on the East Coast. T. angustifolia: In N.S., "local on small lakes around Amherst and scattered along coast to Cheticamp", with four localities along the North Shore. On P.E.I., with three localities in the southwestern part. In N.B., "probably more common than collections seem to indicate"; scattered locales in north and in St. John River valley, with one locale on Grand Manan, Charlotte Co., only one locality from the East Coast, near Point Escuminac, Westmorland Co.. T. glauca: Not distinguished in the N.S. and P.E.I. floras. For N.B. only mentioned as "locally common in the Tantramar Marshes".

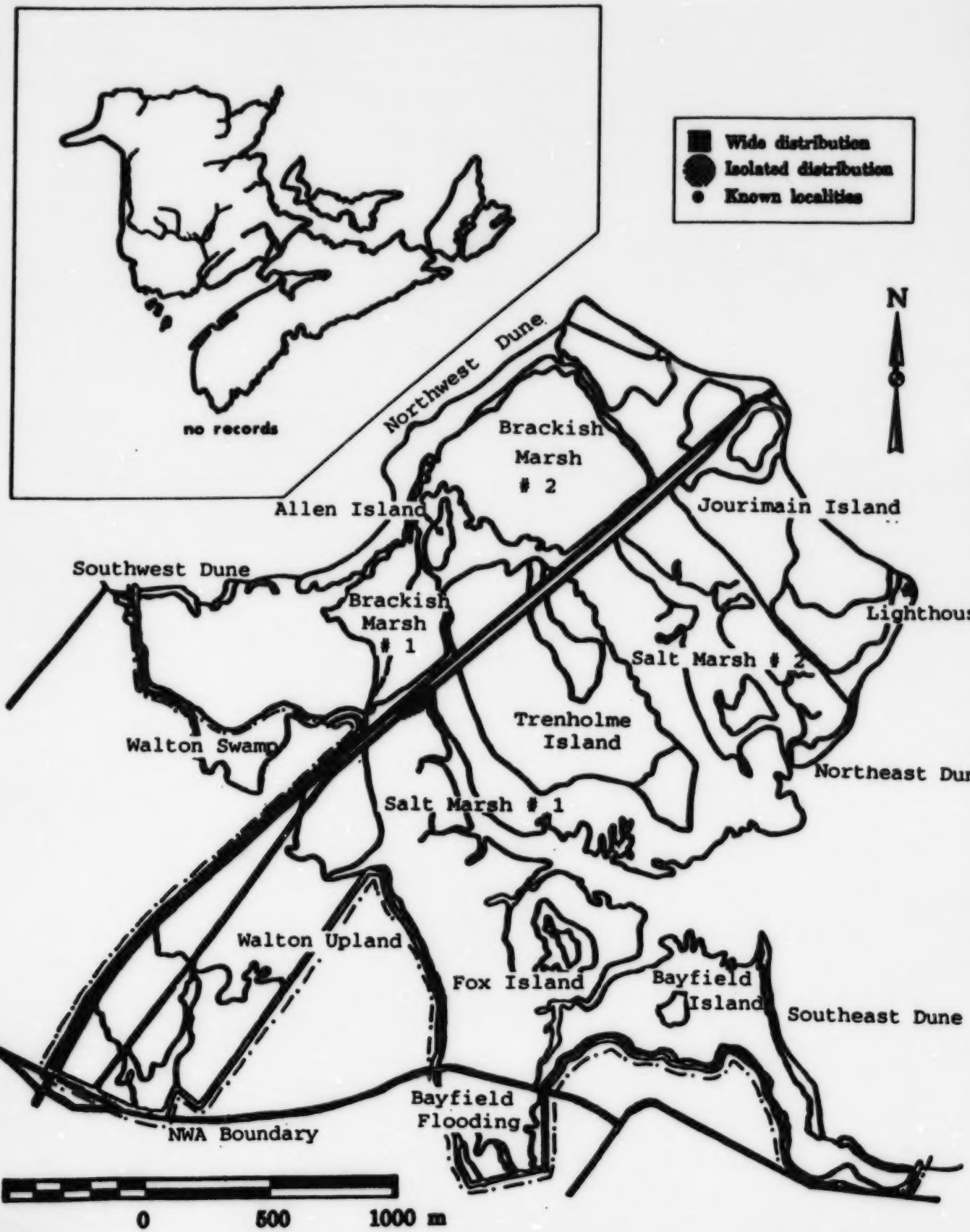
CJNWA: In five extensive colonies forming a discontinuous belt of tall marsh vegetation landwards of the salt marsh, together with Scirpus lacustris and Phragmites australis: (1) In Walton Swamp, most prominent in transition between Scirpus lacustris - Thelypteris palustris - Myrica gale community and the Spartina pectinata community. Largely poor and sterile; fertile patches include one T. glauca, others are T. latifolia. (2) Around and east of Bayfield Island, landward of the saltmarsh, an extensive and well-developed stand including all three species. (3) On Trenholme Island, near its northeastern shore, as a minor scattered component of fresh swamp vegetation with prominent Ilex verticillata, Pyrus arbutifolia, Spiraea latifolia, Myrica gale, and Calamagrostis canadensis. Apparently all Typha latifolia. (4) On both the northeast and southwest shore of Brackish Marsh # 2 and at the northern end of Brackish Marsh # 1, within Spartina pectinata and decadent S. patens vegetation, apparently invasive and spreading. Fertile patches mostly Typha glauca but also some T. latifolia. (T. angustifolia : 880824-02). (5) Small clone of Typha angustifolia in wet bulldozed upland area; apparently established since 1966; (880824-02).

Other records from Tormentine Peninsula: Both T. angustifolia and T. glauca were found in marshes near Cape St. Laurent. (Distribution of T. latifolia was not recorded).

Maritime Habitat: T. angustifolia; Near coast in brackish swales, inland in swamps, marshes, edges of streams, ponds and ditches. T. latifolia; Wet areas in fields, ditches, edges of streams, lakes, ponds, estuaries and occasionally in floating bog associations. T. X glauca; Similar habitat to above species.

Eastern N.A. Range: All three taxa are native and southern. T. latifolia found from Florida to Newf., Anticosti Island, and Gaspé Peninsula; T. angustifolium found from South Carolina to Cape Breton Island, P.E.I., northern N.B., and southern Quebec (to near Sorel). T. X glauca found from North Carolina to central Maine, upper Bay of Fundy, Tormentine Peninsula, and Lac St. Jean area (distribution is poorly known).

** Veronica peregrina L. var. xalapensis (HBK.) St. John & Warren



** Veronica peregrina L. var. xalapensis (HBK.) St. John & Warren

Maritime Provinces: For N.S., no record in Roland and Smith (1969), but reported for the province in Scoggan (1979). For P.E.I., not recorded. In N.B., "widely scattered in southern half"; map shows no East Coast records.

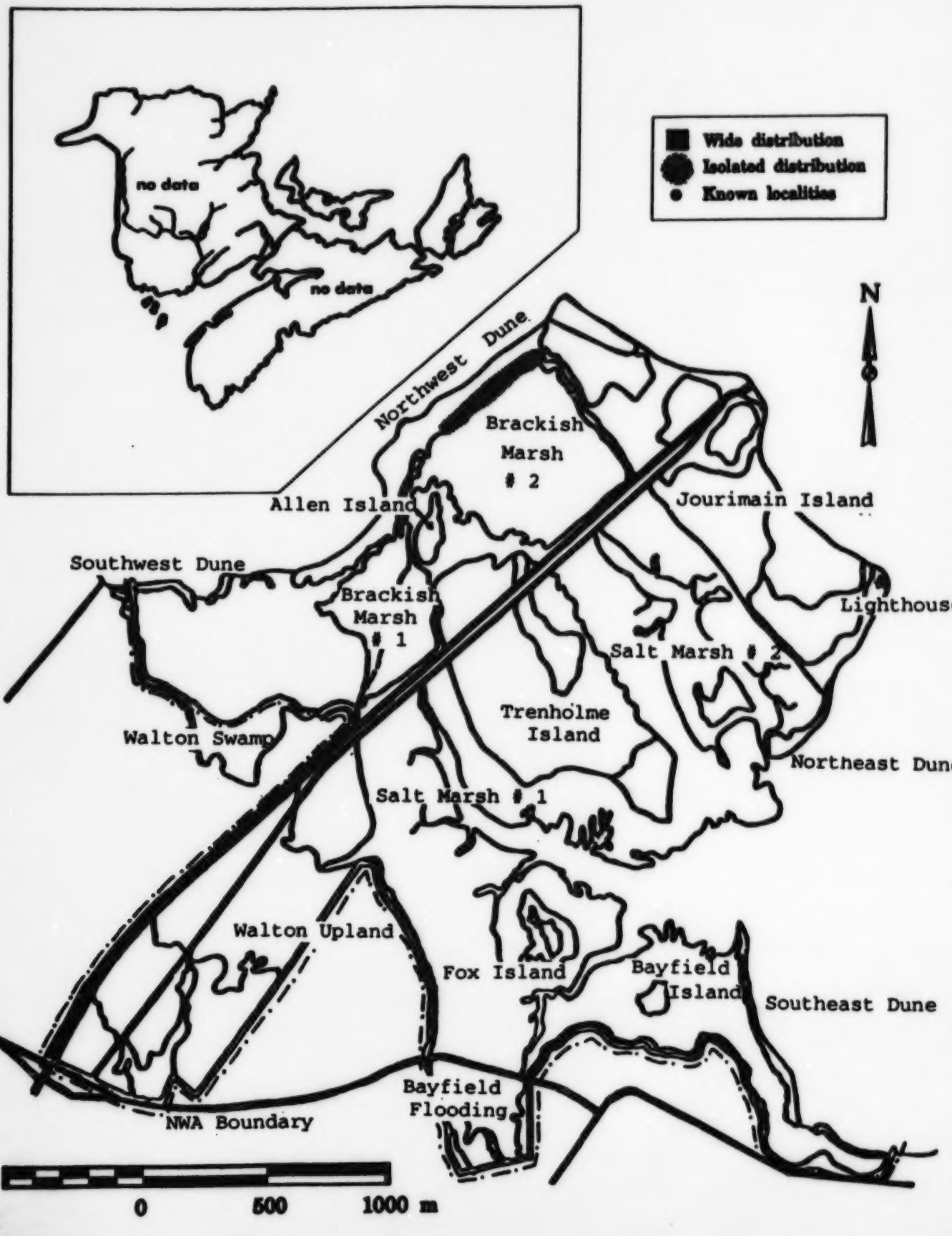
CJNWA: Known only by a colony of about 50 plants on eastern causeway, between Trenholm Island and the mainland on bare mud of vehicle tracks, together with Juncus tenuis, Agrostis palustris, Centaurium pulchellum, and Gnaphalium uliginosum. Present nearby are Solidago sempervirens and Trifolium procumbens (890818-08).

Other records from Tormentine Peninsula: None.

Maritime Habitat: Dry, sandy, open places.

Eastern N.A. Range: Introduced from southwestern North America. Found from Georgia to Maritime Provinces and Quebec (to Montmagny Co.).

* Vicia tetrasperma L. Moench.



* Vicia tetrasperma L. Moench.

Maritime Provinces : In N.S., "frequent in the Annapolis Valley...scattered and becoming more common elsewhere". On P.E.I., two localities, both near the coast in Queen's Co.. In N.B., reported as being present but no information on distribution.

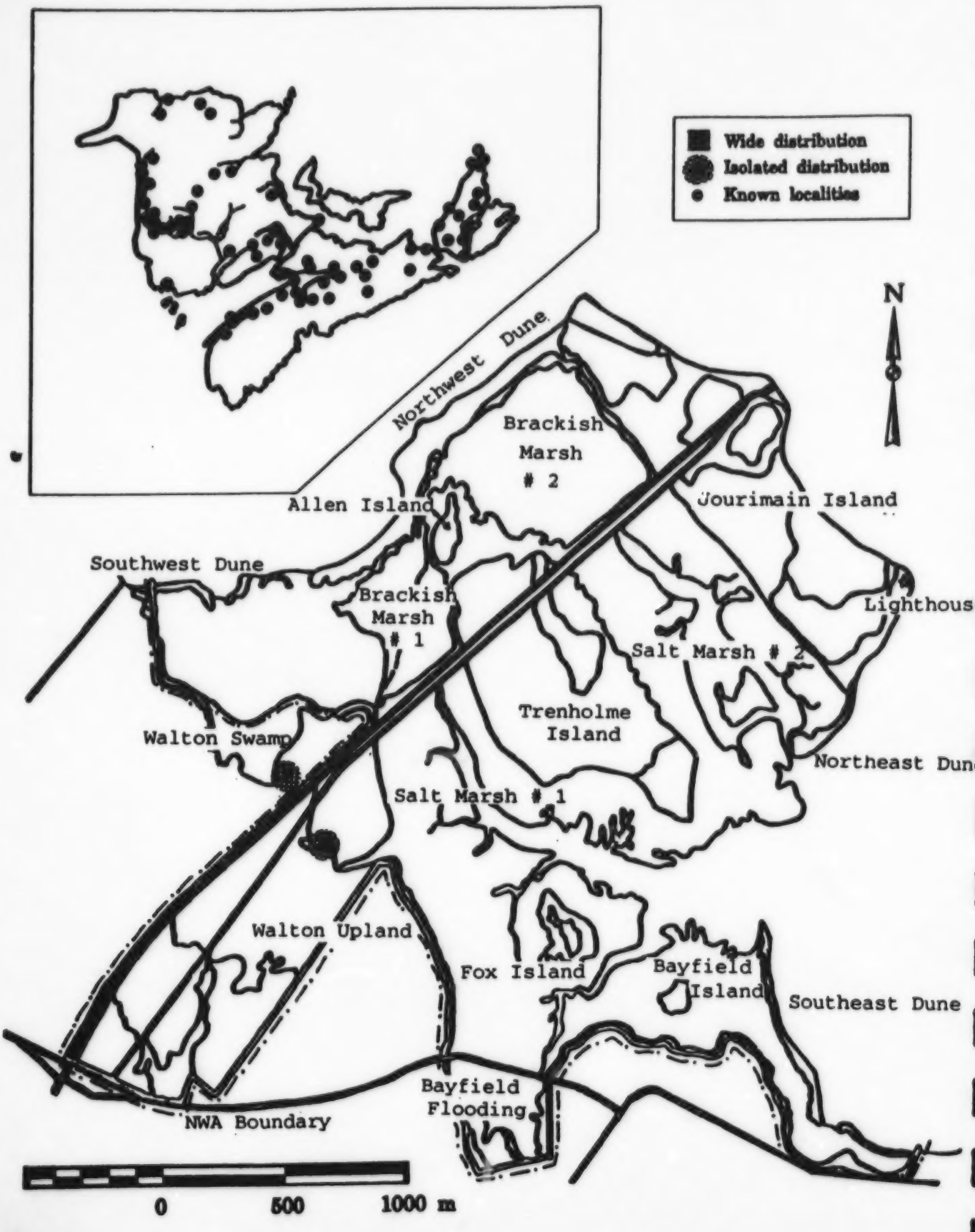
CJNWA: Found between the Northeast Dune and Brackish Marsh #2, in the salt marsh, with recently dead or decaying Spartina patens, Festuca rubra, and Carex palacea. Locally prominent and even dominant, together with other ruderals including Trifolium arvense and Galium trifidum var. halophilum (880818).

Other records from Tormentine Peninsula: None.

Maritime Habitat: Introduced to roadsides and waste areas, and occurs as weed in orchards and gardens.

Eastern N.A. Range: Introduced from western Eurasia. Found from Florida to St. Pierre and Miquelon, Newf., Côte-Nord, and Chicoutimi Co., P.Q.

* Viola conspersa Reichenb.



* Viola conspersa Reichenb.

Maritime Provinces: In N.S., frequent from Digby Neck to Cape Breton Highlands, and "absent in southwestern N.S. and along the Atlantic coast". On P.E.I., not reported. In N.B., "common through much of the province", but only found at one locality on east coast, at Kouchibouguac Park, Kent Co.

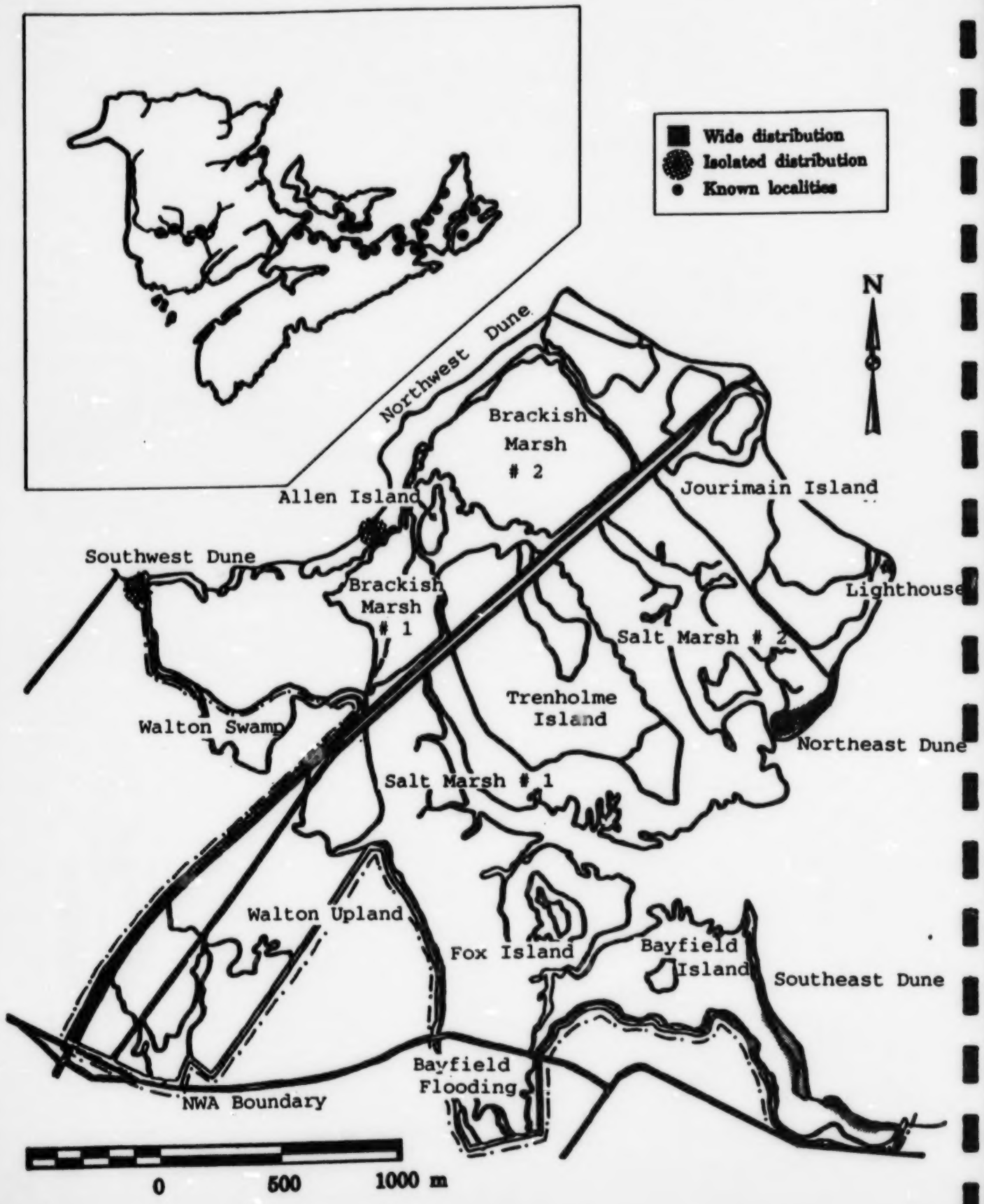
CJNWA: Two separate plants under Alnus rugosa, in Walton Upland Swamp, both on east and west side of causeway (890516-01).

Other records from Tormentine Peninsula: One isolated population south of Walton Swamp, just outside the NWA.

Maritime Habitat: Damp, moist deciduous woods and alluvial meadows.

Eastern N.A. Range: Native. Southern. Found from Georgia (mountains) and southern New England, to Cape Breton Island, Gaspé Peninsula, and Tadoussac.

* Xanthium strumarium L.



* Xanthium strumarium L.

Identification: Specimen keyed with Scoggan (1979, p. 1624); key features fit this species rather than the similar X. echinatum Murr. which may have been expected because of the seashore habitat. Specimen appears to be the same taxon as a specimen from Gilbert Island, St. John River floodplain (K. Suddard, 162-1972) which was identified as X. strumarium and is within the New Brunswick range reported for this species by Hinds (1986).

Maritime Provinces: In N.S., (as X. echinatum) reported on sandy and gravelly beaches of Northumberland Strait, Bras d'Or Lakes, and Cape Breton Island's outer shore. On P.E.I., shores of Northumberland Strait east of Charlottetown. In N.B., "locally common in the Miramichi River estuary" and the floodplain of the lower St. John River.

CJNWA: Found mainly in areas behind the beach, with soil enriched by wrack deposition. Two colonies recorded on the Northeast Dune and the Southeast Dune. In both localities, the species is prominent and locally dominant, together with Sonchus arvensis, Solidago sempervirens, and Atriplex spp. A third small colony with only a few plants is located in a similar environment at the base of the Southwest Dune just outside of the boundary. A few dwarfed adventitious plants occur on the upper beach of the southwestern extension of the Northwest Dune (880817-24).

Other records from Tormentine Peninsula: Occasional plants in similar shore habitats, as above, from CJNWA boundary to Peacock Cove, as well as near Murray Corner (900823-01) and west of Cape St. Laurent (890916-01).

Maritime Habitat: Sandy or gravelly shores, on beaches above the high tide line, and waste areas.

Eastern N.A. Range: (For X. echinatum Murr.) Native. Southern. Found from Virginia to southwestern Maine, lower St. John River, N.B., and Northumberland Strait to Cape Breton Island.

Rare New Brunswick Plants

THE NEW BRUNSWICK SALT-MARSH ASTER

(Aster subulatus Michx. var. obtusifolius Fern.)

Hal Hinds

On July 25, 1902, M.L. Fernald and E.F. Williams collected a small aster growing in salt marshes at the mouth of the Nepisiquit River in Bathurst, New Brunswick. Dr. Fernald, botanist extraordinaire from Harvard University, immediately recognized the aster as an unusual varient of the Salt-marsh Aster (Aster subulatus Michx.) which ranges from southern Michigan and southern Ontario and New York to southern Maine, south along the coast to Florida and Louisiana.

When S.F. Blake visited the area in 1913, he collected abundant material of this Salt-marsh Aster along the mouth of Middle River, Bathurst Bay, and sent it to Professor Fernald. With this added material Fernald was able to compare the New Brunswick specimens with the more southern types, and he decided to separate the Bathurst Bay populations as variety obtusifolius. This he published in Rhodora, 16 (184) with the explanation that the variety differs from the typical form in its relatively broad, obtuse- or round-tipped rather than long-attenuate leaves, its subequal rather than distinctly imbricated phyllaries, and its 1-rowed ray-ligules much surpassing the pappus rather than 2-rowed only slightly surpassing it.

The New Brunswick population of the Salt-marsh Aster is significant for several reasons. It is possible that the Bathurst Bay population has been isolated from the main interbreeding population for nearly 10,000 years, when the last Pleistocene glaciation retreated northward. For several thousand years the continental shelf and other areas off the maritime coast were above sea level and apparently supported vegetation characteristic of low, swampy and boggy habitats. In the estuaries of this broad shelf the aster would undoubtedly have flourished and may have occurred as far north as the Gaspé.

When the land and sea level continued to rise as a result of the further retreat of the glacier, the continental shelf was drowned and only the Bathurst Bay population of the aster survived in Atlantic Canada. Elsewhere, the species survived in isolation in southern Ontario, southern Michigan, and New York, with the main body of the population being south of the glacial maximum from southern Maine to Delaware south to Florida and Louisiana.

The long-isolated New Brunswick population, unable to interbreed with the narrow, pointed leaved southern populations, became morphologically distinct as Fernald had outlined.

Fernald and Williams first collected this aster at the mouth of the Nepisiquit River in Bathurst. This population has now been destroyed by the various industrial and residential developments in the area. As far as is known, only a population along the Tetagouche River survives.

The habitat of this truly endemic New Brunswick plant should be protected from undue disruption by the activities of man, and therefore I have recommended to the New Brunswick Department of Natural Resources that an area at the mouth of the Tetagouche River be set aside as an ecological reserve and that the New Brunswick Salt-marsh Aster be designated as an endangered species.